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RYERSON STEEL SERVICE

As the Editor Views the News

THAT a rule of reason may enter belatedly into the administration of NRA is indicated by recent statements by Donald Richberg. A week ago the new co-ordinator displayed a keen understanding of one important problem of small manufacturers when he said: "There are thousands of employers of two, five, ten and 15 men in which the right of individual bargaining may be a very real right and of the very essence of tranquil relations. In such cases employers and employes may work out their problems together, and all may desire to be free from outside control. This statement undoubtedly carried reassurance to thousands of small employers.

• • •

Mr. Richberg's comments at the conclusion of the meeting of the steel code authority on Thursday were even more encouraging. He stated that the "whole purpose of this present NRA reorganization is to create a sense of security and confidence . . . We are working for stability." This definite, unqualified declaration of objective, together with his remarks to the effect that the steel code is operating satisfactorily and that no changes in its pricing policies are contemplated should go a long way in undoing the damage wrought by many previous disconcerting utterances of NRA spokesmen. The Richberg words arouse hope of an era of consistent policy and new efficiency in NRA.

NRA Goal Is Stability

• • •

This is but one of several indications that the outspoken protests of industrial executives (p. 26) against recent radical tendencies in national government at last have forced the President to change his course. In the words of the writer of Windows of Washington (p. 19), "business, finally aroused, has turned his left flank a little." It is doubtful whether President Roosevelt will or can say anything publicly to reinforce the Richberg statements. The Chief Executive still is faced with the desirability of tempering his remarks to meet the exigencies of the approaching elections. Scarcely anything he may say prior to Nov. 6 for political effect can change the fact that in recent weeks his administration has noticeably shifted the emphasis from reform to recovery.

From Reform To Recovery

• • •

News from widely distributed sources indicates a mild revival in interest in machinery and equipment. Members of the Farm Equipment institute, meeting in Chicago (p. 18) reported that collections and sales in the farm implement field are the best since 1931. General Motors, Ford Motor and Packard (p. 22) have purchased a fair number of molding machines and other items of foundry equipment. A few rolling mill projects are pending (p. 84). The representative of an American machine tool building company, recently returned from Europe, reports (p. 25) that machine tool builders in England, Germany and Italy are moderately busy, but that those in France are inactive. An interesting law affecting taxes on automobiles is an important factor in the revival of machine tool activity in Germany.

Equipment Sales Improve

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Just what the activities of the federal housing administration will mean in terms of rehabilitation of old buildings and the erection of new ones is a question of great importance to producers and fabricators of iron, steel and nonferrous metals and to the manufacturers of their products. The statistics of FHA (p. 20), showing 29,000,000 structures in the United States, 16,000,000 of which are in need of repair, indicate a large potential market for these materials. The role of steel in this national movement was emphasized over the air Thursday evening when the National Broadcasting Co. put on a 30-minute program (p. 19) "to make the country steel conscious," in connection with the FHA campaign. The program was historical in character, the activities of William Kelly, D. J. Morrell, Capt. Bill Jones, Andrew Carnegie, Alexander Holley, etc., being mentioned.

Industry Watches FHA

E. L. Shaner

Richberg Puts OK on Steel Code; Promises Stability

NO CHANGE in the NRA steel code is contemplated, Donald R. Richberg, an administration representative on the code authority, intimated following a meeting in New York Thursday with directors of the American Iron and Steel institute, who comprise the authority.

This dispelled rumors current for several weeks that an important revision was impending. These rumors were based upon interpretations of statements by Mr. Richberg, who is chairman of the President's policy-making committee, to the effect that price and production control provisions of codes would be drastically rewritten, if not entirely eliminated.

Another base for these reports was the assertion of Mr. Richberg, in addressing the Baltimore Advertising club, Sept. 19, that the administration of the steel code had set up a bureaucracy and a great deal of red tape.

Says He Was Misunderstood

These interpretations, Mr. Richberg declared Thursday, were misconstructions of his intent. He said he held up the steel code as an example of a code developed by industry and not by Washington and that he was defending NRA from the indictment that it had made codes unwieldly.

"The complications in the steel code were devised by the industry because it was felt they were needed to protect it against unfair practice," said Mr. Richberg. "The industry itself found it very necessary to do a big job of the code. The code has been operating very well and we have had very good results in the way of maintaining employment and increasing wages despite ups and downs in the industry.

"I have cited the steel code a good many times as an example of what you can do by co-operative effort. The whole purpose of the present NRA reorganization is to create a sense of security and confidence in the way the administration is operating. To turn that around into the idea that something new is going to develop is a mistake. We are working for stability.

"At the steel code meeting today we had the usual discussions, but there was nothing in the way of any change or suggestion of discontinuing the code. There was no discussion of prices."

Asked about the 10-day waiting time between the filing of prices and their effective dates, he said:

"I haven't made any recommendations in regard to the code and I am not planning to make any. As a matter of fact, the code is operating without any friction. This code is rather exceptional as to compliance. We don't have much of a compliance problem, and the NRA at Washington has lots of work ahead of it."

Exonerates Government

Addressing the Rotary Club of Chicago, Tuesday, Mr. Richberg referred to the steel code as the most detailed regulatory code that has been written, repeating his comments in Baltimore, and said that "if the steel business is being strangled with red tape and bureaucracy it isn't a government execution but just a private suicide."

In this Chicago address Mr. Richberg pointed out that "the only tolerable way out of this depression is being found in the steady increase of employment in profitable private business." He defended huge government expenditures as necessary to preserve life and promised that they would not be continued beyond the period of necessity.

While stating it was "desirable and necessary" to balance the federal budget at the earliest possible moment, he intimated this was some distance ahead.

In regard to codes, Mr. Richberg said:

The organization of trades and industries for the purpose of co-operation and self-discipline afforded a machinery for direct and indirect controls of production and prices which might be easily misused. No one could question in the early months of NRA the reasonableness of many demands that some assurance should be given to business men, who agreed to enlarge their payrolls and to increase their costs, that they would be protected from cut-throat competition, from destructive price-cutting, and from overproduction that would flood their markets with surplus goods to be sold at less than cost.

Helping Hand Extended

These men were being asked to co-operate with their government to put men back to work and to increase wages. They were entitled to government assistance in protecting a market for their products. Under the law monopolistic practices were not to be permitted. But also under the law temporary restrictions upon production were expressly authorized and destructive price-cutting was a declared evil.

It was plainly the duty of the recovery administration to allow trade and industrial associations to try to find appropriate means to protect at least the recovery of their production costs and to obtain some assurance that goods might be sold at prices sufficient to maintain the wages, hours and other labor conditions required by the codes.

There were also reasonable de-

DONALD R. RICHBERG, No. 1 brain-truster whom the steel industry knows as an administration member on its code authority. Thursday he placed his benediction on the steel code, for the present at least ending rumors of important changes. Originally Mr. Richberg was chief counsel for NRA; as chairman of the President's new policy-making board he is now virtually its head. He is 53, a native of Chicago, is a liberal and is irked by being termed a radical. Wide World photo

mands for price filing requirements in codes, so that various unfair competitive practices might be eradicated through open price quotations. All the code provisions affecting production volume or price competition that have received public criticism in recent months, were approved with two reservations always implied and frequently expressed.

First, they were experiments in industrial self-government which should be given a fair trial as an emergency measure. In many codes such as the steel code approval was given only for a definite trial period.

Second, no approval of any code was intended to sanction the elimination of fair competition in the production of all the goods that the market would absorb at the lowest prices at which they could be produced and distributed without loss. It is not my contention that every code has operated in accordance with these principles. It is probable, despite heated conflicts of opinion, that many codes have provided the means of restricting a competition that could honestly be described as fair or unfair according to the economic interest affected.

To determine accurately where the public interest lies in such a conflict of private interests is frequently an impossible task. In such circumstances it may be the wisest course for the government to decline to interfere in any way and also to decline to permit private associations to attempt to interfere with the exercise of individual judgment.

There is a great deal of emotional feeling on both sides of this issue.

(Phase turn to Page 84)

Labor

APPARENTLY not satisfied with the job the Amalgamated Association of Iron, Steel and Tin Workers has done, the American Federation of Labor is going to do the organizing direct.

At its annual convention in San Francisco, the federation Thursday voted to project itself into the iron and steel industry. Presumably, the organizing will be done through a vertical union, of the type which the federation last Thursday approved.

When the Amalgamated began organizing the industry last spring, radical elements got out of control of Michael F. Tighe, 76-year old president, and a strike was called for June 15, but was averted by the appointment of the national steel labor relations board.

Temporarily, Mr. Tighe won a victory over radicals who constituted "rank and file" committees. However, in the election Sept. 15, the ballots of which will be counted Saturday in Pittsburgh, it is believed that George J. Williams, of Canonsburg, Pa., a rank and filer, beat him for president.

Formal approval of vertical unions by the convention was a distinct break with the craft unionism which has dominated the organization activities of the federation since its inception. Typical of craft unions are the bricklayers, electricians, carpenters, etc. Typical of vertical unions is the United Mine Workers of America.

The federation last week voted to issue charters for vertical unions in the automobile, cement and aluminum industries. It is expected that such a charter will also be issued for the proposed steel union.

BACK DOWN ON HOUDE

Labor forces sustained a bitter defeat last week when the department of justice announced that it would not prosecute the Houde Engineering Corp., Buffalo, for its failure to abide by the majority rule in the representation of labor, as decreed by the national labor relations board.

Declaring that it would deal with its employes according to their membership in outside organizations or the company union, Houde officials refused to accept the outside union as spokesman for all. With a fanfare of publicity, it was said in Washington that Houde would be made an example. But Thursday, Attorney-General Cummings said "no immediate action is contemplated in the Houde case" because there was insufficient evidence to warrant court action.

At Wilmington, Del., the case of the department of justice against the Weirton Steel Co., involving the Dec. 15, 1933, election of representatives for collective bargaining, dragged on. The government continued to attempt to prove coercion. Counsel for the company lost a point when the court permitted introduction of evidence which would "cost terrifically" to refute. But an affidavit against the company, charging intimidation, was repudiated by a signer.

MORE HEARINGS CALENDARED

National Steel Labor board will hold the following hearings this week:

Monday, Oct. 15, Youngstown Sheet & Tube Co., East Chicago, Ind. Petition of Lake Front lodge, Amalgamated association, for an election.

The same day Youngstown Sheet & Tube Co., Hammond, Ind. Petition of New Deal lodge for an election.

Tuesday, Oct. 16, Acme Steel Co., Chicago, application for election, also to consider discharge of employes.

Wednesday, Oct. 17, Continental Can Co., Chicago. Complaint of Clearing lodge charging denial of collective bargaining rights.

Thursday, Oct. 18, Gary Screw & Bolt Co., Gary, Ind. Petition of Dunes lodge for an election.

A hearing will be held in Pittsburgh, Friday, Oct. 19, on a complaint against the Jones & Laughlin Steel Corp., Aliquippa, Pa., charging interference and coercion in the exercise of collective bargaining rights.

Confirmation that all is not peace-

WASHINGTON GOES IN FOR SCAFFOLDING: This view of the Washington monument, enveloped by 600 tons of steel scaffolding for the first cleaning in its history, was taken from beneath a steel scaffold on the west side of the department of commerce building. Strangely enough, the latter scaffold, which is directly under the former office of General Johnson, NRA ex-administrator, is for chiseling purposes. But the chiseling is not the kind that aroused the general's ire; it is for putting an inscription on the building. Acme photo

ful within the ranks of the Amalgamated association came with the news last week that a meeting held on the southside of Pittsburgh, Oct. 4, ended in a free-for-all fight and a call for police reserves.

Smoky City lodge, No. 176, composed mainly of Serbs, was being taken to task for failure to pay some $64 in dues to the Amalgamated's central treasury, and after a severe reprimand by an official of the Amalgamated, the group broke up amid disorder and missiles.

Meetings

PLANT visitation to nearby foundries will be featured at the fifth international foundry congress and thirty-eighth annual convention and exposition of the American Foundrymen's association in Philadelphia, Oct. 22-26.

A special train will take founders to visit the Bethlehem Steel Co. at Bethlehem, Pa., on Oct. 26, where in addition to a complete steel plant, the steel foundry which is said to have produced the largest steel casting ever made—a platen or cylinder jacket weighing 460,000 pounds—will be viewed.

Other foundries and plants open to inspection include the Philadelphia navy yard; Florence Pipe & Foundry Co., Florence, N. J.; Edward G. Budd Mfg. Co., Philadelphia; Henry Disston & Sons Inc., Philadelphia; the Point Breeze refinery of the Atlantic Refining Co.; SKF Industries, Philadelphia, and Radio Corp. of America, Camden, N. J.

The annual banquet will be held at the Bellevue-Stratford hotel, Oct. 24, with Andrew W. Robertson, chairman of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., the principal speaker.

GEAR MAKERS AT MILWAUKEE

American Gear Manufacturers association has scheduled its seventeenth semiannual convention at the New Pfister hotel, Milwaukee, Oct. 22-23. Speakers will include: P. C. Day, Falk Corp., Milwaukee, on "Modern Methods of Transmission;" W. E. Sykes, Farrel-Birmingham Co. Inc., Ansonia, Conn., on "Advantage of Sykes Herringbone Gears;" Paul Christensen, Cincinnati Gear Co., Cincinnati, O., on "Fallacy of Price Cutting as a Basis of Getting Sales;" H. H. Kerr, Boston Gear Works, North Quincy, Mass., on "Status of Our Code;" Arthur Simonson, Falk Corp., Milwaukee, on "Good Steel Foundry Practice;" Thomas Holloway, United Engineering & Foundry Co., Pittsburgh, on "Welded Steel Construction;" F. E. McMullen, Gleason Works, Rochester, N. Y., and Prof. Frank Mickle, University of Michigan, Ann Arbor, Mich., on "British Standards."

NRA

SUIT has been filed by W. Ames & Co., Jersey City, N. J., manufacturer of steel and iron products, against PWA Director Ickes, Secretary of Agriculture Wallace and Thomas H. McDonald, chief of the bureau of public roads, involving alleged discrimination under the steel code.

For 75 years producing steel used in the construction of roads and bridges, the Ames company contends that the steel code "ruinously discriminates" against it and imposes "fictitious freight rates" which make it impossible for it to do business under the code.

The three defendants in the suit, which was filed in the supreme court of the District of Columbia, are charged by the Ames company with undertaking to force it to agree to sign both the steel and the reinforcing code. Without such compliance, the Ames company points out, no road or bridge builder or contractor is permitted to buy from it.

PROMISES "GO SLOW" POLICY

S. C. Williams, new chairman of the national advisory board, at his first press conference Friday said that "there will be no sweeping changes in the price fixing question, at least at this time." Every case will be taken up individually. He said that the new board will go into the principles of the leading codes, but he refused to express any personal opinion relative to the reduction of hours for labor, and said this is one of the things that the new board must take up. He stated that the board will make an effort to get better compliance, but no policy has yet been adopted on compliance. He will give full time to his new job for the present. He said NRA is not now at the spectacular or glamorous stage of its work, which had a definite place at the beginning, but is now at the more deliberative stage of development. The new board has a long list of problems on its agenda to be studied, of which he said compliance is one of the most important.

STUDY JUDICIAL SETUP

The President conferred Friday with Donald R. Richberg, Attorney-General Cummings, and G. S. Ferguson, of the federal trade commission, in connection with the judicial end of NRA. It is understood unofficially that it was decided at the conference that NRA enforcement should be handled through an informal working agreement between various government agencies, rather than through the creation of a new board. The NRA compliance board will continue to have the first say, but will keep in close touch with the justice department and federal trade commission on the proposed new setup.

CAP SCREW DISCOUNT 2%

National industry recovery board has approved action of the supplementary code authority for the cap screw manufacturing industry, making 2 per cent the maximum cash discount which may be offered or allowed by any member of the industry. The 2 per cent limitation constitutes uniform credit terms.

¶NRA has approved an amendment to the steel casting industry code, which was effective Sept. 24, adding rules of fair trade practice for the manganese steel castings group which now is operating under the steel castings code.

¶A hearing will be held at the Steuben club, Kansas City, Mo., Oct. 23, on an agreement to establish standards of hours, rates of pay, and other conditions of employment for the roofing and sheet metal contracting industry in the vicinity of Kansas City.

¶Extension of the code for the aluminum industry for a further trial period of 90 days was ordered by NRA Oct. 9. The code originally was approved June 26.

¶Supplementary code for the file manufacturing industry, a division of the fabricated metal products manufacturing and metal finishing and metal coating industry, was approved Oct. 11, effective Oct. 19. The provision prohibiting sales below cost except to meet competition and to dispose of dropped lines and seconds was stayed.

ALLEN MADE ADVISER

W. L. Allen, formerly chairman of the Sheffield Steel Corp., Kansas City, Mo., has been made a special adviser on general NRA matters.

¶Charles K. Bardes, of the Brooklyn Steel Co., Brooklyn, N. Y., has been appointed member of the code authority for the secondary steel products warehousing trade, to represent members of the trade not members of the National Association of Distributors of Secondary Steel Products.

Financial

REPUBLIC STEEL CORP. has issued a comparison of the total funded debt and preferred stock of important steel producers related to ingot capacity.

At present, Republic has outstanding bonded debt and preferred stock totaling $22.39 per ton of ingot capacity, whereas, on absorption of the Corrigan, McKinney Steel Co., Cleveland, this will be reduced to $20.52 per ton of ingot capacity.

As calculated from the pro forma

balance sheet as of June 30, the proposed new prior preference stock of Republic would have behind it assets of $577 per share, and the common stock a book value of $39 per share after deducting the new prior preference stock at its par value.

¶Mesta Machine Co., Pittsburgh, last week declared a 66 2/3 per cent stock dividend, issuing two new shares of common for each three now held, to be issued Nov. 30 to record of Oct. 25.

At the same time, Mesta is calling all of its outstanding 6 per cent preferred $110 as of Oct. 30.

For Mesta, which is one of the large builders of continuous rolling mill equipment, this involves the retirement of 11,877 shares of preferred at $1,162,150 and the issuance of 400,000 additional common shares of $5 par value, making 1,000,000 shares outstanding.

SENIOR CAPITAL STRUCTURE OF LEADING STEEL PRODUCERS, PER TON OF STEEL INGOT CAPACITY

	Funded Debt	Preferred Stock	Total Funded Debt and Preferred Stock
Republic Steel Corp.	$10.48	$11.91	$22.39
Republic-C. Mck. (as proposed)*	15.09	5.43	20.52
United States Steel Corp.	4.06	13.27	17.33
Bethlehem Steel Co.	13.07	10.26	23.33
Jones & Laughlin Steel Corp.	2.10	16.04	18.14
Youngstown Sheet & Tube Co.	28.37	4.81	33.18
National Steel Corp.	17.72	....	17.72
Inland Steel Co.	20.25	....	20.23
Wheeling Steel Corp.	17.48	25.39	42.87
American Rolling Mill Co.	19.07	.93	20.00

*Per consolidated pro forma balance sheet.

LOSES IN THIRD QUARTER

Transue & Williams Steel Forging Corp., Alliance, O., reports net loss of $50,419 in the third quarter, after taxes, depreciation and other charges, compared with net profit of $9806 in the preceding quarter, and profit of $3740 in the third quarter of 1933. For the nine months ended Sept. 30 it showed a net loss of $57,154, against $69,541 in the corresponding period last year.

¶National Steel Corp., Pittsburgh, Friday declared the regular quarterly dividend of 25 cents on its common stock, payable Oct. 31 to record of Oct. 22.

Structural Code

HANDICAPS in obtaining state and federal contracts because they are not operating under a code have been removed from structural steel fabricators by a retroactive stay on the code for that industry.

Approved originally on July 11, to become effective July 22, fabricators refused point blank to abide by their emasculated code. Two executive orders stayed the effective date of the code until Aug. 16. The order announced Wednesday is retroactive to that day.

Further conference will be held shortly in an effort to work out a compromise. The chief obstacle is NRA's insistence that erection of structural steel come under the construction code which would result in a closed union shop.

Iron Ore

STEAMER STADACONNA of the Canada Steamship Co. recently made some fast loadings of iron ore at Superior, Wis. It took on 13,082 tons in 4 hours, 10 minutes, Sept. 29; 13,167 tons in 3 hours, 35 minutes, Oct. 4; and 13,296 tons in approximately 3 hours, 45 minutes, Oct. 9.

For routine loadings in a slow iron ore season these are interesting, but—the D. G. KERR, a United States Steel Corp. steamer, in 1921 loaded 12,508 tons in 16½ minutes, as a test performance. Previously, in 1913, she loaded 12,689 tons in 30 minutes, and subsequent to her "staged" record she loaded 12,869 tons in 1 hour, 15 minutes, including time in maneuvering at the dock.

Nevertheless, the STADACONNA'S cargoes are the largest loaded at upper lake ports this season. They were consigned to the Algoma Steel Co., Saulte Ste. Marie, Ont., by the M. A. Hanna Co.

Schwab Wins Leniency for Banker Friend in Trouble

EXPLAINING that he was "not a young or a well man" and that it was the first time he ever addressed a judge in open court, Charles M. Schwab, veteran chairman of the Bethlehem Steel Corp., appeared in federal court in Pittsburgh last week to urge clemency for the president of a small national bank in Pennsylvania who was accused of embezzling $85,000.

Since he was principal stockholder in the bank, Mr. Schwab pointed out that he was the only one to sustain a financial loss. Because he made the alleged embezzler president of the bank, Mr. Schwab expressed a sense of responsibility for him. In addition, Mr. Schwab cited that the banker was a boyhood friend and companion of his and "he always believed in young men."

The two-year sentence then imposed by the federal judge was regarded as a lenient one for the offense.

Foreign

LAST week official reports were received from Tokyo, Japan, by the bureau of foreign and domestic commerce, Washington, indicating that inquiries totaling 100,000 tons of various steel products would be soon issued by buyers in the Osaka district to replace buildings destroyed by a recent typhoon.

Reports say that in the recent catastrophe, 13,000 factories were demolished, as well as 211,000 other houses and buildings. The former included a large number of steel-producing and metalworking plants, as well as textile factories.

PWA

A SPECIAL board, composed of army engineers and PWA representatives, reported last week that the proposed Atlantic-Gulf ship canal across Florida is outside the normal self-liquidating requirements of PWA, and that while such a canal could earn operating and maintenance expenses it could not retire a bond issue even at a 2 per cent interest rate within a reasonable period. When this canal was broached, it was reported that an effort would be made to locate steel fabricating plants near it.

Production

STEELMAKING production was fractionally stronger last week, but was not enough to raise the national rate above 25 per cent. If proposed schedules are maintained this week, a slight rise is anticipated. The only increases last week were registered in the eastern Pennsylvania and Youngstown districts, each reporting a gain of ½-point, all other districts remaining unchanged. Details for various districts follow:

Youngstown—Eased up fractionally to 29½ per cent last week, due to several bessemer converters being put on.

Chicago—Unchanged at 26 per cent, with possibilities seen of a slight increase this week. Blast furnace schedules are unchanged, with eight of 36 steelworks stacks active.

Pittsburgh—Steady at 18 per cent

last week, with an unchanged rate expected for this week. The two leading interests here are each operating at 20 per cent, although rates of the smaller independents are somewhat less than this average. In fact, the bessemer and open-hearth department of a district pipe producer closed last week.

Thirteen out of 60 steelworks blast furnaces are reflecting a loss of one. National Tube Co. has banked its one remaining Monongahela stack; Carnegie Steel Co. has 7 of 32 on; Jones & Laughlin Steel Corp., 3 of 11; Pittsburgh Crucible Steel Co., 1 of 2 at Midland, Pa., and Bethlehem Steel Co., 2 of 7 at Johnstown, Pa.

Central eastern seaboard — Up fractionally to 17 to 18 per cent, with the suspension of three open-hearths at one plant being offset by slightly better operations at certain other plants. The above mentioned

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1934	1933	1932	1931
Jan.	231,777	285,138	426,271	800,031
Feb.	385,500	275,929	413,001	762,522
March	588,209	256,793	388,579	907,251
April	643,009	335,321	395,091	878,558
May	745,063	455,302	338,202	764,178
June	985,337	603,937	324,746	653,104
July	369,938	701,322	272,448	593,900
Aug.	378,023	668,155	291,688	573,372
Sept.	370,306	575,161	316,019	436,928
9 Mo.	4,797,162	4,157,058	3,166,045	6,419,844
Oct.		572,897	310,007	476,032
Nov.		420,358	275,594	435,697
Dec.		600,639	227,576	351,211
Yrl. adj.		44,283	5,160	6,046
Total		5,805,235	3,974,062	7,676,741

group of three open hearths are expected to be put back in operation this week, which may make for a further improvement in the general rate for the district.

Birmingham — For the fourth consecutive week, steel operations were at 25 per cent last week, and this rate is likely to hold at this level this week. Demand for steel is on a low scale, but several furnaces are being kept in shape should any sudden buying be developed.

Wheeling — Held steady at 33 per cent last week, but this week steel making schedules will drop 10 points to 23 per cent, owing to two district producers each dropping two open hearths, making a total of 9 of 39 on schedule.

Cleveland-Lorain — Steelworks operations are scheduled this week at 28 per cent, for the fourth consecutive week. National Tube Co., Lorain, is operating five open hearths, Corrigan, McKinney Steel Co. four, and Otis Steel Co. two. Sheet mills here and in an adjacent lake district

(*Please turn to Page 82*)

Implement Sales Make Big Gain

FARM implement manufacturers for the first eight months of this year increased their sales about 85 per cent over the corresponding 1932 period, the low mark of recent years, and both collections and business in 1934 have made the best showing since 1931.

This report was made by Harry G. Davis, director of the research and statistical department of the Farm Equipment institute, in an address on "The State of the Industry" before the forty-first annual convention of the Farm Equipment institute, held at the Blackstone hotel, Chicago, Oct. 10-11.

Mr. Davis estimated this year's business at $180,000,000 to $190,000,000, compared with $120,000,000 in 1933 and $117,000,000 in 1932. For the next year further gains are expected to result from the tremendous backlog of unfilled equipment needs, coupled with increased buying power of farmers.

More than 150 members of the institute attended the convention, a large portion of which was devoted to the consideration of the industry's code. While some features of the farm equipment code have proved beneficial to the industry, other portions are regarded as having unfavorable results.

Mr. Davis pointed out that the spreading of work resulting from the minimum number of hours worked has created employment for 19,000 additional workers in the farm implement industry but that this has been at the expense of $6.85 weekly for each of 32,800 other employes.

This situation has resulted in more or less agitation for higher rates of pay and at the same time a proposal from the administration to reduce hours still further without cutting weekly wages.

Engenders New Co-operation

On the other hand, the director stated the farm equipment code has developed and fostered a degree of co-operation that never before existed in the industry. Filing of prices and exchange of price information through the institute were credited with having a stabilizing effect in the industry and it was recommended that these features be continued in the event the code should cease to exist.

Only a portion of the increase in employment has resulted from the shortening of hours of work. A survey shows that the number of shop employes rose 75.4 per cent between June, 1933 and June, 1934. Of this gain 32 per cent was due to shorter hours of work and 43.4 per cent to the increase in production. Mr. Davis indicated that the farm implement industry has been harder hit since 1929 than the majority of other manufacturers of capital goods.

Figures taken from a report of the durable goods committee and presented at the convention showed that farm equipment manufacturers had a loss of 32.5 per cent on sales in 1932 and 15.5 per cent in 1933 against 18.3 and 6.3 per cent, respectively, for the average of 83 industries made up of 2275 individual companies.

Sales of the farm equipment group in 1933 were 20.9 per cent of the 1929 total compared with 32.8 per cent of the 1929 volume for the others. Surplus of the former at the end of 1933 had dropped to 47.7 per cent of that at the end of 1929 against 55.3 per cent for the average.

Officers elected were: President, W. King White, president, Cleveland Tractor Co., Cleveland; executive chairman, W. C. MacFarlane, president, Minneapolis-Moline Power Implement Co., Minneapolis; director of code activities, F. H. Clausen, president, Van Brunt Mfg. Co., Horicon, Wis.; secretary, Robert A. Jones, Chicago; and A. E. McKinstry, president International Harvester Co., Chicago, and W. B. Brinton, vice president, J. I. Case Co., Racine, Wis., were elected honorary members of the institute.

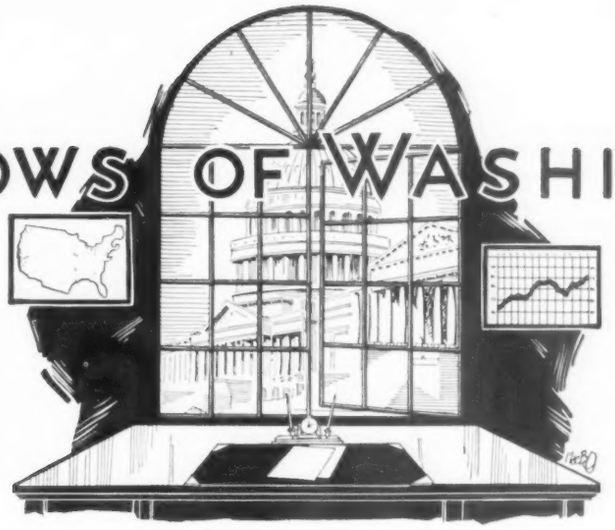
How Metal Show Visitors Voted on New Deal

A majority of visitors to the National Metal exposition, held Oct. 1-5 in the Port of Authority building, New York, who participated in STEEL's poll of opinion on the new deal, voted that NRA has harmed rather than helped their companies, that the new deal has harmed instead of helped the voters individually and that the overwhelming approval of the new deal existing in the early days of the present administration has turned to disapproval.

The result of the balloting follows:

1.—In 1932 I voted for:	
Roosevelt	267
Hoover	139
Thomas	37
Foster	7
2.—Had I known then what I know today I would have voted for:	
Roosevelt	322
Hoover	380
Thomas	26
Foster	20
3.—From March 4, 1933, and for months afterward (i. e., in the early days of the present administration):	
I favored the New Deal	533
I did not favor New Deal	288
4.—Today:	
I favor New Deal	324
I do not favor New Deal	431
5.—In my opinion, the New Deal has	
Helped me personally	305
Harmed me personally	388
6.—In my opinion NRA has	
Helped my company	314
Harmed my company	394

WINDOWS OF WASHINGTON



WASHINGTON

WITH the Washington merry-go-round whirling at an even faster gait the past week, fact and hope concerning business and the new deal tend to merge in a dizzy haze, and about the only solid deduction possible now is that the administration acknowledges the necessity for more recovery before indulging in social reform.

Judging from developments and some semiofficial utterances of the past few days, this further measure of recovery is to be stimulated by rising commodity prices overlaying a dim threat of monetary inflation. The obvious and desired result will be protective or hedging buying, of the nature which jumped steel production in the spring of 1933 from a monthly low average of 15 per cent in March to 58 per cent by July.

PRESSURE BRINGS RESULTS

There is nothing conclusive at the moment upon which to base any genuine expectation that the President is turning his back on the new deal or a planned economy and is swinging to the right. It is more accurate to say that business, finally aroused, has turned his left flank a little. Probably the greatest good that will come out of this situation is business becoming conscious of its power and learning what labor has long known—that pressure is the only thing Washington understands.

For the moment, Donald R. Richberg, whom many now think rates as No. 1 braintruster, holds the center of the stage, and while some of his statements are conflicting, the burden of them is reassuring to business. But it cannot be forgotten that in the wings are Secretary of Labor Perkins, Relief Administrator Hopkins and other liberals, while in 12 weeks will convene a congress more radical than the last one. Even should he desire to, it would be difficult for the President to escape from the social reform whirlpool.

Rarely has Washington witnessed such a spectacle involving the relationship of business and government as the one now visible. While the President's fireside radio chat Sept. 30 was defensive in some respects and a mild retreat from the Green Bay speech, nevertheless its tone was truculent and his fling at bankers and the declaration that labor would not be regimented in the service of monopoly were plainly for the consumption of the masses.

At the same time, Professor Moley was holding night meetings with industrial leaders in an effort to sound them out and appease them. Also at that moment, the President was grooming Mr. Richberg for his program of addresses calculated to reassure industry and make NRA more palatable. These two developments are almost diametrically opposite to the impression conveyed by radio to the public.

Incidentally, recent developments on the steel code indicate what a tight spot the administration is in. When in Baltimore Sept. 19 Mr. Richberg attacked the steel code as a hive of bureaucracy and a welter of red tape he gave comfort to consumers. In steel, as in coal, considerable buying has been held back by the expectation of a dissolution of codes, restoration of a completely free market, and consequent breaking of prices.

RICHBERG ABOUT-FACES

But Thursday Mr. Richberg assured the American Iron and Steel Institute, the steel code authority, that the code is satisfactory and no major operation on it is necessary. From the standpoint of producers of steel this was heartening; the almost simultaneous hint from Washington that further inflation is possible reinforced the price structure tremendously. But what must be the feelings of automobile manufacturers, the railroads and other large consumers, who have been banking on elimination of price and production control provisions from codes to work in their favor? What pleases the producer displeases the consumer.

Recently economists in Washington have been discussing the desirability of lower prices. In the case of steel they visualized an adjustment downward as necessary to stimulate volume, which would make the lower levels remunerative. But the President himself is now flirting with the

NBC Sketch Boosts Use of Steel in Housing Campaign

NATIONAL BROADCASTING CO. in a 30-minute program Oct. 11 over its "blue" network cooperated with the federal housing administration in boosting the use of steel in homes. This was in line with promotional efforts urged by Windows of Washington in STEEL *for Sept. 24, page 28, and also this week.*

Tracing the development, first of iron and later of steel, the NBC program graphically presented incidents connected with the smelting of iron ore at the Jamestown settlement; Lynn, Mass.; the part played by early smelters in the revolutionary war and the construction of the wrought iron chain across the Hudson river at West Point; the experiments of William Kelly in developing the bessemer process at Eddyville, Ky.; Mr. Kelly's conversion of D. J. Morrell to his process at the Cambria works in Johnstown, Pa.; the start of Andrew Carnegie's career and his association with Capt. Bill Jones; and finally the appearance of Capt. Alex Holley before the British Iron and Steel Institute in 1881.

The object of the program was to make the country steel conscious, in connection with the FHA campaign.

idea of a further rise in commodity prices before stabilizing the dollar and linking it with sterling.

The fact is, these discrepancies are more apparent in Washington than elsewhere, and that business is so eager for the slightest straw of assurance that inconsistencies are glossed over.

TO SOME it begins to look as if the President is traveling the same psychological road that General Johnson did.

At the beginning of NRA, it will be recalled, General Johnson appeared to be a partisan of labor and cracked down hard on industry. His closest advisers were labor leaders or were labor-minded.

Swollen by the attention paid it, labor grew out of hand and became presumptious to the point where the general could neither control nor stomach it. He broke first with the Amalgamated Association of Iron, Steel and Tin Workers in June, when the steel strike was threatened, and his resignation followed his exposure of the textile workers' union.

The President, a patrician by birth and instinct, also bore down heavily on industry from the start, almost taking a delight in putting it on the rack. He very definitely aligned himself with labor when capital and labor confronted each other.

As it did at NRA, organized labor began edging up on the President. He could not get out from under the automobile strike threat, but since then he has kept labor troubles from his doorstep, other than naming the various labor relations boards.

PRESIDENT GETTING FED UP?

There are plenty of indications that the American Federation of Labor has grown as distasteful to the President as it did to General Johnson. The latter could resign, but the President, who would be very much more at home with Myron Taylor and Eugene Grace than with William Green and John Lewis, must stand and take it.

It begins to look, too, as if the President were fed up on some of the liberals and radicals with whom he surrounded himself. Much as he may want to establish a better balance between capital and labor or see that he has crowded industry to the point where it is fighting back, he will shortly find himself confronted with the almost irresistible pressure of a radical congress.

After he had been in the White House a short time the late President Harding wished he could change his friends. Perhaps Mr. Roosevelt now wishes he could change his policies.

Toward the close of his administration, industry could forgive General Johnson much but could not forget him. Industry is so eager for the slightest bit of encouragement that it could forgive all that has gone before, but it never can forget. The President, like General Johnson, may find himself neither fish nor fowl. He will eventually learn that his place in history will depend upon the state of business during his regime; he already has alienated industry, and despite his attentions labor is restive.

THE first rumblings of this congressional situation are rolling eastward from San Francisco, where the American Federation of Labor is in annual convention.

The federation has declared unequivocally for a 30-hour week, with 40-hour pay. Senator Black, of Alabama, who sponsored such a bill at the last session of congress, has announced he will introduce it again. The federation has pledged a majority in the house to vote for it.

It is probable that the house at least, and possibly also the senate, will put through a 30-hour bill and pass the buck to the President. This would be an easy settlement for a troublesome issue on the part of congress, but would put the White House on the spot.

Another cauldron of trouble that is brewing is the agitation for federal incorporation of business. Organized labor is strongly for it, seeing the opportunity to wedge in a clause denying federal incorporation to those refusing to bargain collectively with labor.

Meanwhile, the emergency council over which Mr. Richberg presided during the summer has formulated a program of social reform for presentation to the coming congress. If the President should "pull" his punch a little on unemployment insurance and old age pensions, there are a score in each house who would delight to take the lead themselves.

It is going to take all the tact the President has to nurse business along and at the same time keep his social reformers in hand. The impression is getting around Washington that the President is not quite the assured person he was a year ago—which is understandable considering the problems at hand.

There is increasing comment in Washington that the Green Bay address of the President, on his return from Hawaii, was a psychological mistake. He then errupted all the long pentup resentment within himself against business, and having reached a peak there was only one way he could go. He has experienced the weakness that accrues to a man after he has exposed his entire hand.

STEEL'S opportunities for furthering the use of steel in the home and to launch, at government expense, housing projects embodying all-steel construction are the greater because individuals are slow in responding to the federal housing administration's program.

While housing loans are being made at the rate of slightly more than a million dollars a day, nevertheless at this rate it would require approximately six years to push out two billions—which is not curing the present depression.

It is almost as though homeowners were on a strike. If industry and capital are loath to make investments or borrow government money for productive purposes because they cannot see adequate assurance of profit—and for this they are being accused of being on strike—then homeowners likewise are reluctant to go into debt until their incomes are safer.

So, as the FHA program lags in this respect, its sponsors, which are business men, are the more ready to embrace any reasonable scheme for putting money in circulation in the construction industry. The alacrity with which FHA would get behind a project to replace "company houses" in the coal, coke, ore and other industrial regions with a steel house costing $2500 to $3000 might be surprising.

Few statistics are so compelling as those concerning housing. As compiled by Albert L. Deane, a former General Motors vice president and now assistant director of FHA, there are 29,000,000 structures in the United States — including office buildings, factories, apartments, individual houses, filling stations, almost everything with a roof.

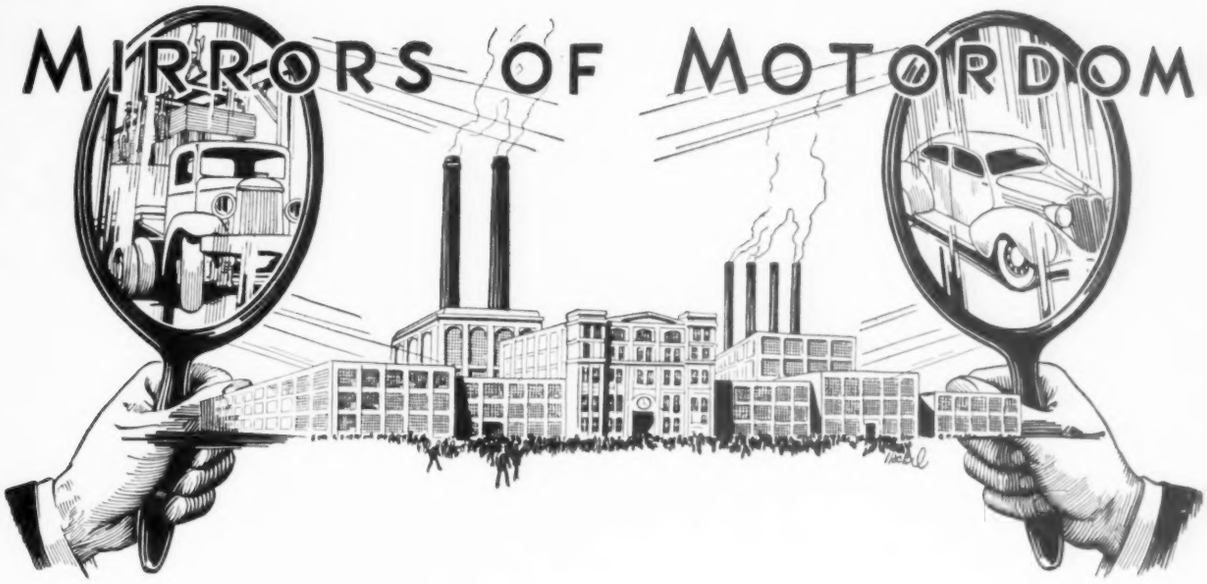
MARKET EXCEEDS BELGIUM

Of these 29,000,000 structures, 13,000,000 are in good shape, and 16,000,000 are in need of repair. Of these 16,000,000 "bad order" structures, 3,000,000 are in such a physical state that nothing short of a major remodeling operation will save them. In fact, many of them should be razed. It is the 13,000,000 structures that can be remodeled, rebuilt and modernized that the FHA is attempting to save.

If an average of a half ton of steel could be put into each of these 13,000,000 buildings, say for roofing, bathrooms, piping, hot water systems, heating systems and other conveniences, it would supply steelmakers a backlog sufficient to run five months at the October rate of production.

Twenty-nine per cent of all urban dwellings are without either bathtub or shower, 72 per cent lack central heating plants, 38 per cent have no facilities for hot water supply, 36 per cent cook without gas or electricity.

As Mr. Deane puts it, the need for materials and labor in rehabilitating housing is greater than it was in the devastated regions of France and Belgium after the World war.



DETROIT

FOURTH quarter finds the automotive industry in a happier position than it occupied a year ago so far as preparations for new models are concerned.

The tool and die strike of late 1933, timed to hit the industry at its most critical period, necessitated the farming out of much work to outside plants and was accompanied by considerable delay and inconvenience.

Major design changes adopted by some car builders, notably independent front-wheel springs by General Motors and airflow bodies by Chrysler and DeSoto, involved feverish activity in preparing production facilities to meet the new order.

The result was that when the curtain was rung up on the 1934 revue, most of the actors knew their lines but in some cases their costumes were barely in place.

Today the labor situation in the tool and die industry is quiet. The union has been trying hard to reorganize, but most of the tool and die workers are disgusted over their past experiences with this body and are more in favor of company unions than of an industry group.

RETOOLING NO PROBLEM

Patternmakers recently returned to work following a strike which produced none of their demands. From the labor standpoint, consequently, the industry sees nothing at the moment to interfere with its program.

As reported previously, radical design changes are missing in plans for 1935 cars, so that retooling will not be the problem it was a year ago. Bodies, radiators, hoods and fenders of most models will bear the principal marks of distinction between the new cars and their immediate predecessors.

Motor companies frequently have last-minute changes in design that mean production delays, but in general the changeover this year should be relatively smooth and certainly in pleasant contrast to the confusion of 12 months ago.

Approach of this changeover period is indicated by the increasing number of plant shutdowns recently which have resulted in a sharp drop in production from the weekly average in September. Some recovery developed last week, however, from the low level of the preceding week when Ford operated only two days, curtailing its output about 10,000 units. Ford made 10,800 last week.

Chevrolet also cut schedules substantially, assembling 8400 units last week. Buick, down the first half of this month for inventory taking, was to resume assemblies this week.

Dodge, on the other hand, has completed production of 1934 cars and is added to the other members of the Chrysler group on the inactive list. Dodge may be required to build more commercial cars of the present series, otherwise assembly lines will remain closed until production of 1935 models starts.

With decreases during the remainder of October more likely than gains in output of those companies still operating, the total for the month will be little more than 100,000 units. November is indicated as the earliest that the largest producers will get under way on new models, with the possible exception of some of the Chrysler units.

Streamlining and spring suspension were subjects of prime importance in automotive developments this year and bid fair to continue as major points of discussion in 1935, with considerable interest centered on the outcome of the activities of the various schools of thought on these principles.

General Motors apparently will string along for the present with its streamlining ideas, as typified in the present LaSalle, which are regarded as being better adapted, from the standpoint of appearance, to small cars than is the airflow scheme of Chrysler.

MINOR CHANGES FOR OLDS

The new low-price Pontiac, which will be streamlined to a greater extent than formerly, will include the small, prow-like radiator such as introduced this year by LaSalle.

Oldsmobile, however, is understood to be planning only slight body changes from the 1934 design which has proved so successful. Oldsmobile production for the first nine months made the largest percentage gain over the 1933 period of any of the General Motors units, its sales doubling. The Oldsmobile motor will undergo some changes intended to provide better performance and higher speed.

Chrysler will stand pat on airflow design for the DeSoto and the Chrysler, but will retain the conventional

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1932	1933	1934
January	119,344	130,087	156,907
February	117,418	106,888	231,707
March	118,959	118,002	331,263
April	148,326	180,713	354,745
May	184,295	218,347	331,641
June	183,106	253,387	308,051
July	109,143	229,357	266,575
August	90,325	232,855	234,809
September	84,150	191,800	155,000*

*Estimated.

Estimated by Cram's Reports

Week Ended	
Oct. 6	18,998
Oct. 13	25,491

six-cylinder Chrysler series in next year's cars. Principal revisions in the airflow bodies will be in the front-end, which will be narrowed and lengthened somewhat.

Plymouth and Dodge will adhere to conventional lines as at present but with certain alterations in appearance, none of them radical.

One streamlining tendency that appears to be gaining gradual acceptance is the sloping of a back-end from the top, away from the car, such as employed by Dodge, Cadillac and certain models of other makes this year as well as on the new Packard introduced recently.

Activities of the Leaf Spring institute, an organization of leaf spring manufacturers, promise a lively contest between proponents of leaf and coil springs for acceptance of their respective designs for independent suspension.

A design of the institute is said to give riding qualities such as are claimed for cars equipped with coil members, and leaf spring manufacturers now appear to be in a position to regain at least part of the position they lost this year due to the widespread use of coil springs.

Several companies are said to be considering the adoption of the independently sprung leaf spring design. Ford remains, as before, a champion of leaf springs but expects to provide improved riding characteristics through a longer wheelbase on new models.

NOW AIR CONDITIONING?

Despite the progress made in motor performance and riding comfort in recent years, no car builder would admit that the last word has been attained in either respect. With emphasis recently placed on improvements in the latter, there is the opinion that air conditioning of cars is a major step not unlikely to be taken in the near future.

McCord Radiator & Mfg. Co. is conducting experiments with a cooling system using propane gas, a method the company believes will be adopted for automobile body cooling. Both General Motors and Chrysler, through subsidiaries, are intimately acquainted with air conditioning practice that would stand them in good stead in the development of equipment for automobile use.

Packard has experienced good retail demand for its new 1935 models but dealers recently have been short of several body types. Output of 806 units last month is to be stepped up to 1100 in October.

The new small Packard, expected to sell for $1200 or less, will not be announced until early in January. While plans for this car are progressing, the tooling work recently had not been let. Tool and die shops here have been receiving a large portion of their business from Ford and Chrysler, with the General Motors program well out of the way.

Auburn is another company experiencing difficulty in supplying dealers with new models, due to delays in receiving certain materials. Output recently averaged 50 units daily, five days a week. September production of 1040 cars is expected to compare with about 900 this month.

Stocks of Hudson and Terraplane cars on Sept. 1 averaged about five cars per dealer, a reduction of 42 per cent from peak stocks held in May. The company showed the second largest percentage increase in sales, compared with last year, of all producers from May 1 to Sept. 1. Production of about 2200 units this month will complete the run on 1934 cars. Last week's total reached 500.

Studebaker expects to announce new models in December. September output declined to 2300 cars, substantially higher than the 1000 built a year ago, with October schedule calling for about 2500 assemblies. Work on 1935 cars will start next month.

American Austin Car Corp. reports the largest number of orders for immediate shipment in its history for this period. The Butler, Pa., plant is working full time. Plans for reorganization and refinancing are understood to be taking form.

In the preparation for new models, considerable buying of foundry equipment by automobile builders has developed, along with purchases of dies and retooling activity. The Ford Motor Co. is placing a $200,000 program for its Rouge foundry, consisting principally of a large number of molding machines, sand preparation equipment, etc. General Motors Corp. is buying 40 or more molding machines for Saginaw. The Packard Motor Car Co. also is negotiating for miscellaneous foundry equipment.

MOTORDOM SHORTS

The White Co. is announcing that it is putting its new 12-cylinder pancake horizontally opposed engine into production. New equipment purchased for this program includes a goliath press which drills 204 holes of various sizes simultaneously. Another machine bores cylinder head stud holes and taps them, one interchangeable head being equipped with 38 drills and another with 38 ground thread taps . . . . Chrysler has ordered 2,000,000 hub caps from the Moto-Meter Gauge & Equipment Co. . . . . McAleer Mfg. Co., Detroit, is pushing a new type of steam heating system for cars and trucks which draws its water supply directly from the motor block. Liquid from the engine is taken through a copper supply tube to a special steel boiler tube held in place in the exhaust pipe. Here it is rapidly converted into steam which travels through an insulated copper tube to the top tank of the heater. Condensate from the bottom is returned to the radiator . . . . General Motors Oct. 29 will open a special course for service managers at the General Motors institute in Flint, Mich., designed to school service managers in the principles of shop operation and merchandising, in order to improve service on General Motors cars.

One of Every 210 Persons Employed Is an Engineer

BASED upon 1930 census reports, engineers constitute 0.48 per cent of total employment in the United States, according to the American Engineering council, Washington. Public utilities lead with 3.51 per cent of their employes engineers, forestry and agriculture are at the bottom with 0.01 per cent. In iron and steel the ratio is 0.70 per cent. A comparison of industries follows:

	Per cent engineers of total employment
Industries and trade	0.27
Iron, steel, machinery, and vehicles	0.70
Misc. mfg. industries	1.28
Other industries and trades (misc.)	.10
Chemical, allied industries	.89
Trade (insurance, real estate, etc.)	.20
Metal industries except iron, steel	.50
Wholesale, retail trade	.02
Food, allied industries	.11
Printing, publishing	.16
Clay, glass, stone industries	.31
Lumber, furniture industries	.11
Textile, clothing industries	.06
Leather belt, shoe factories; tanneries	.04
Professional workers (per cent consulting and independent engineers	1.84
Transportation	.85
Government service	2.42
Building industry	.64
Public Utilities	3.51
Communication	2.30
Extractive industries (mining oil wells, etc.)	.67
Forestry and agriculture	.01
Total (weighted average)	0.48

A breakdown of engineers, by classes, who totaled 225,787 out of 47,273,311 persons employed in April, 1930, shows this result:

Professional group	Number	Per Cent
Civil engineers	101,946	45.12
Electrical engineers	57,735	25.56
Mechanical engineers	54,264	24.03
Mining engineers	8,408	3.75
Chemical and metallurgical engineers	3,434	1.54
TOTAL	225,787	100.00

Industrial Men in the Day's News

Arnold Lenz, To Be Awarded J. H. Whiting Gold Medal of the American Foundrymen's Association

Tribute will be paid to his many improvements and innovations in foundry technique and operation.

Born in Germany, he came to this country at the age of 18, thirsty for knowledge and eager to work.

With the exception of one year, he has been associated with General Motors Corp. since 1916.

ARNOLD LENZ, prominently identified with the motor castings industry for many years and now assistant manufacturing manager in charge of the Flint, Bay City and Saginaw, Mich., plants of the Chevrolet Motor Co., will be awarded the J. H. Whiting gold medal at the annual meeting of the American Foundrymen's association in Philadelphia, Oct. 22-26. The medal is awarded annually for notable contributions to the foundry industry.

Born in Hauingen, Germany, in 1888, Mr. Lenz was apprenticed at the age of 14 to the firm of Sarsin, Staehlin & Co., Haagen. He attended night school during the four years of his apprenticeship, and when he came to this country in 1906, he spent two years working his way through New York state normal school, Fredonia, N. Y.

In 1908 he entered the employ of the Browning Foundry Co., Ravenna, O., as molder. After working there as coremaker and melter, he became foreman for another company. From that time on he was given more responsible positions with other foundries in the Ohio district.

In May, 1916, he became an instructor in the foundry of the Buick Motor Co., Flint, Mich. That year he was promoted to general foundry foreman and then to assistant superintendent.

After a year spent as assistant to the manager of the Aluminum Casting Co., Detroit, he returned to General Motors Corp. as superintendent of a new gray iron foundry in Saginaw, then under construction. Since then he has held increasingly responsible positions with General Motors. Recently he was elected president and chairman of the board of regents of General Motors institute.

For his contributions to the development of the foundry industry, and especially for his work on the production of large quantities of automotive castings, Mr. Lenz last year was given the honorary degree of doctor of engineering by the University of Aachen, Germany.

□ □ □

William E. S. Dyer, for nearly 30 years actively engaged in the construction engineering field, has been elected president of the Edge Moor Iron Co., Edge Moor, Del. He has directed the design, construction and operation of numerous high-efficiency power plants, and has done considerable extensive research throughout Europe and this country.

□ □ □

Claude A. Steadman has become associated with the Pioneer Engineering & Mfg. Co., Detroit, designer of tools, dies, gages and special machinery. He formerly was with various motor companies as tool and die engineer, later with the Taft-Peirce Mfg. Co., Woonsocket, R. I., and for the last five years has been chief tool designer for the Wright Aeronautical Corp., Patterson, N. J.

□ □ □

B. R. Ludewig, of the engineering staff of the E. J. Bell Co., Oshkosh, Wis., manufacturer of special machinery, has returned from Johannesburg, South Africa, where he superintended the erection of machinery for a large match plant, equipment for which was designed and erected by the Bell company.

□ □ □

Russell L. Van Cleve has been appointed manager of blast furnace products, coke by-products, and scrap purchases, for Carnegie Steel Co., Pittsburgh, succeeding Thomas Woods, who recently resigned under the operation of the Carnegie retirement plan. Mr. Van Cleve was born in New Jersey in 1890, and graduated from Princeton university with a degree in civil engineering in 1913. Shortly afterward he became affiliated with the Riter-Conley Mfg. Co., Leetsdale, Pa., and in 1914 went to Carnegie Steel Co., in the open-hearth department. Later the same year he was transferred to the Edgar Thomson works, where he was enrolled in a postgraduate course. Two years later he was transferred from the rolling mill department of the latter works and in May, 1917, was appointed chief clerk of the open-hearth department. Since September, 1920, he has been affiliated with

Russell L. Van Cleve

the general offices of the company in the special agent department, until recently as assistant to Mr. Woods who in turn was assistant to the president, I. Lamont Hughes.

□ □ □

A. F. Steubing has been appointed railroad mechanical engineer in the commercial office of the United States Steel Corp., 71 Broadway, New York. He formerly was chief engineer of the Par Car Corp., New

York. Born in Lewiston, Me., in 1889, he attended Cornell university and the University of Illinois. He entered railroad service in 1911, with the Boston & Albany, later becoming affiliated with the Pennsylvania railroad and then with the Chicago, Rock Island & Pacific. Subsequently he became associated with the Simmons Boardman Publishing Co., New York, as associate editor of *Railway Age* and then managing editor of *Railway Mechanical Engineer*. From 1923 to 1932 he was chief engineer of the Bradford Draft Gear Co., Chicago, and a successor, the Bradford Corp., New York, following which he became associated with the Par Car Corp.

□ □ □

E. S. Rooney, district sales manager for Youngstown Sheet & Tube Co. at Cincinnati for the past 11 years and with the Sheet & Tube company for 28 years, has been retired as of Oct. 1. After having been a salesman for the Carnegie Steel Co. for six years in Cincinnati, he opened the district sales office of Sheet & Tube at Pittsburgh in 1906. There he remained until he was assigned to open the district sales office for the company at Cincinnati in 1923. While he has received several offers to re-enter business, he proposes to treat himself to a vacation to last indefinitely.

Kenneth J. Burns, for some years with the Cleveland sales office of Sheet & Tube and lately in the home office at Youngstown, succeeds Mr. Rooney as sales manager of the Cincinnati district.

□ □ □

William J. Baldwin, ceramic chemist and foreman of mill room and smelting department for the American Radiator Co., Buffalo, since 1926, has been appointed to the fellowship in enamel technology established about a year ago at Mellon Institute of Industrial Research, Pittsburgh, by the O. Hommel Co., Pittsburgh. In his new position he will devote most of his time to investigations in plants, his services being available gratis to companies confronted with problems relating to enamel frits and their industrial use.

□ □ □

E. P. Kastien, who has been associated with the Keystone Steel & Wire Co., Peoria, Ill., for about 18 years, serving as purchasing agent since 1921, has been promoted to the position of general superintendent in charge of operations and purchasing.

□ □ □

Elmer B. Dunkak, who has been sales manager of the C. M. Kemp Mfg. Co., Baltimore, has been elected vice president.

□ □ □

Daniel B. Worth, chief engineer of the Whitcomb Locomotive Co., Rochelle, Ill., is now associated with

E. S. Rooney

the engineering department of the Baldwin Locomotive Works, Philadelphia, where he will be identified with the engineering of Baldwin and Whitcomb electric and internal combustion locomotives.

Edward P. Nachtel, Whitcomb production engineer, remains at Rochelle, where he will be in charge of inspection and will provide engineering contact with the Whitcomb shops.

□ □ □

Bonnell W. Clark has been appointed vice president and general manager of Westinghouse Electric Supply Co., East Pittsburgh, Pa. He has been general manager of this Westinghouse division since 1927.

H. N. Gansman, general sales manager in New York for the supply company, has been named a vice

(*Please turn to Page* 83)

A. F. Steubing

Died:

KENNETH I. SMALL, 55, manager of the New York office of the Chicago Bridge & Iron Works, Chicago, as a result of an automobile accident in Portland, Me., Oct. 10. Born in Chicago, he had been associated with Chicago Bridge & Iron for more than 30 years. He opened the New York office of the company in 1910, since which time he has been in charge there.

□ □ □

Franklin M. Bowman, 60, vice president of Blaw-Knox Co. since 1912, in Pittsburgh, Oct. 12.

□ □ □

R. Y. Ferner, of the R. Y. Ferner Co., Washington, importer of precision machinery and scientific instruments, in Washington, Oct. 7.

□ □ □

Louis B. Strayer, 50, assistant secretary and treasurer of the Joy Mfg. Co., Franklin, Pa., in that city, Oct. 4, following a brief illness.

□ □ □

Edward J. Deckman, 56, president of the E. J. Deckman Co., Pittsburgh, sales engineer and a member of the Engineers' Society of Western Pennsylvania, in Pittsburgh, Oct. 6.

□ □ □

William A. Kirby, 56, for many years a manufacturing executive with the Fisher Body Corp., Detroit, in that city, Oct. 3, after an eight months' illness. He joined the Fisher organization shortly after its inception.

□ □ □

William A. Baker, 61, for many years a heating and ventilating engineer and since 1931 president of the American Temperature Indicator Co. of Winthrop, Mass., in that city, Oct. 7. Born in Fremont, O., he was later active as an engineer for Bartlett Bros Co. in Cleveland.

□ □ □

A. J. Grymes, 68, since 1918 president of the Vulcan Iron Works, Jersey City, N. J., in East Orange, N. J., Oct. 7. For a number of years prior to 1918 he was associated in executive capacity with the Erie railroad, and also headed the Grymes Engineering Co. of Jersey City.

□ □ □

James M. Rawle, 64, since 1926 vice president of the J. G. Brill Co., Philadelphia, at his home in Yeadon, Pa., Oct. 4. He had been connected with the Brill company since 1906 and was a member of the board of directors.

□ □ □

George E. Harris, 72, formerly superintendent of the rail-finishing mills at Braddock, Pa., for Carnegie Steel Co., in New Bloomfield, Pa., Oct. 6. Born in Bethlehem, Pa., he first worked at the former Bethlehem Iron Co., before going to the Braddock plant in 1890.

Finds Machine Tool Business Good in England, Germany, Italy; Poor in France

INCISIVE observations on conditions in the machine tool markets of Europe were presented by Alfred E. Drissner, vice president and chief engineer, National Acme Co., Cleveland, at the thirty-third annual convention of the National Machine Tool Builders association at Atlantic City, Oct. 1-3.

As to England, Mr. Drissner said that for more than a year machine tool plants have been extremely busy —both on domestic and foreign orders. The British machine tool salesmen recently have adopted much more aggressive selling methods than they exercised in the past, this being true in domestic as well as in foreign fields. In this connection, Mr. Drissner mentioned the fact that the "Buy British" movement still is a very important factor, and that American companies who are having their machines manufactured in England by English companies are in a favored position at the present time.

Unions De-Racketeered

According to Mr. Drissner, England experienced some 50 years ago the labor troubles which we are going through now. Today English labor unions are guided by leaders respected both by the government and by industry. An English workman to be indorsed by his union must be a really capable and well trained man. His union membership is a guaranty of it.

Mr. Drissner looks upon England as Europe's most feared nation politically. The government has won confidence both at home and broad, income taxes are being reduced, and individuals and corporations are spending money freely for improvements—thereby stimulating the capital goods industries.

French Strangle Prosperity

France—stated Mr. Drissner—is in bad condition. While a few large companies, such as Citroen, are re-equipping for economical and accurate mass production, most French industrialists still are hanging onto their war profits and refuse to spend money for new equipment. Such companies can produce goods at low cost only by paying unduly low wages, thereby strangling prosperity at the source.

In Germany the machine tool business has been good for the last year and a half. Much night work now is going on with Russian orders an important factor. Four to five months deliveries are being quoted.

Mr. Drissner mentioned as an important stimulant to domestic business the fact that the German automobile is free from tax the first year, with the tax increasing year by year thereafter until by the end of six years the obsolete car literally is "taxed off the road" and it is cheaper to buy a new one.

Switzerland is in the position of having high value money which will purchase favorably in foreign markets but which in turn discourages the foreign purchase of Swiss-made goods.

Italy is making great strides in engineering and in industry, has plants second to none in Europe, and has become a favored industrial adviser and supplier to Russia. Mr. Drissner mentioned the ball and roller bearing plants of Italy as equaling those of Sweden, and as the cleanest and best arranged of any he ever had seen.

1933 Rolling Mill Census Shows Loss

BUREAU OF THE CENSUS, Washington, makes the following report of principal manufactures from rolling mill products, other than tin plate, terne plate, wire and wire products, showing production, by class, kind, quantity and value and the number of establishments reporting, for 1933 and 1931.

Separate reports are issued on tin and terne plate and wire and wire products. In addition to the products covered in this report, steelworks and rolling mills give the manufacture for sale of various other com-

(*Please turn to Page* 89)

Sees Broader Use of Scrap Helping To Decentralize Steel Industry

THE constantly increasing percentage of scrap used in the production of steel means that the availability of pig iron is no longer the principal item in determining the proper location of a steelworks," states Barton R. Shover, consulting engineer, Oliver building, Pittsburgh, in a study in the trend of steel production.

This means, according to Mr. Shover, that future increases in steelmaking capacity probably will not occur in what are known as steel centers but this new capacity will be in comparatively small units at points where scrap is available at favorable prices. The presence of scrap, he states, will be evidence that there is a demand for steel there. Says Mr. Shover:

"A number of small rolling mills now use old rails and scrap for their raw materials, but since their product does not comply with the large majority of physical and chemical specifications, they are frequently obliged to either discontinue operation or purchase specification billets from the larger companies. Billets are usually expensive and sometimes difficult to obtain, therefore a method which would enable these small rolling mills to produce their own billets at reasonable costs would obviate much of their present difficulties.

"Several small plants do produce their own steel but they seldom obtain the billets at a cost lower than that of the purchased article. The reason for this is the high cost of making and breaking down their small ingots into billets, the comparatively low yield and high operating costs of such procedure and the fixed charges on the investment for heating furnaces, break-down mills, etc.

"Under the heading 'Progress in Steelmaking' in the Aug. 27 issue of STEEL, mention is made of a method of casting billets direct from the output of the steel furnace, which may be bessemer, open hearth, or electric, in accordance with local conditions. As this method has been in constant and successful use for about 15 years for the manufacture of high grade steels, and the product proven to be equal to the best, it is by no means an untried experiment.

"The financial advantages to be obtained from such steelworks are readily apparent. Because of its economical operation on small tonnages, together with the relatively low capital investment necessary, and low operating costs, it can be located where scrap is available and freight charges on finished product are practically eliminated.

"This is in complete harmony with the tendency toward decentralization, applied to steel production, and furnishes the consumer in the local district this basic product at prices lower than he can now obtain. This lower price to the consumer should increase the demand for steel and tend toward the improvement of business activity in the entire district in which such a plant is located."

EDITORIAL

Now Is Time To Show Courage of One's Convictions!

EVERY now and then one of several prominent executives in industry expresses himself privately upon what he terms the mistaken policy of openly criticizing the present government administration.

These executives, who unquestionably constitute a minority in the high ranks of industry, believe it is impolitic for anyone identified with their industries to question President Roosevelt's policies. In explanation of this attitude, one company president recently argued as follows:

"I am opposed to statements from authoritative speakers in my industry which criticize the present government administration. Our industry already has a black eye in the mind of the President and his advisers. Why aggravate the situation by stirring up antagonism and thus inviting recriminations against our industry?"

We find it increasingly difficult to understand or sympathize with this viewpoint. Undoubtedly there was some excuse for it in the early days of the Roosevelt administration. Then, in company with the great majority of other commentators, the editors of this publication refrained from commenting critically upon many phases of the new deal which patently were open to question. We, in unison with others, felt that in the emergency then existing, the new government should be given every opportunity to show what it could do.

However, after a reasonable interval it became evident that the President was being influenced unduly by visionary experimenters and that his policies, if continued much longer, would retard recovery rather than stimulate it. When this point became clear, many industrialists, economists, editors and others, who up to that time had restrained their impulse to criticize, came out openly to speak their minds.

Critics, Condemned as Tories, Saved Nation From Pursuing Path of Folly Too Far

Looking back over the past 12 months, one can find abundant evidence to prove that those who took up the cudgels in defense of the interests of industry performed a far greater service to the cause of national recovery than did those few industrialists who counseled against criticism of the government administration. Those who openly explained their sincere objections to certain obnoxious phases of NRA, for instance, contributed more to the correction of dangerous trends in government policies than did the executives who continued openly to speak well of NRA while inwardly thinking ill of it.

The nation can thank the outspoken critics of the government—the Tories, if you please—for having saved millions of employes from being "sold" into the bondage of professional union labor. Likewise it can thank the little handful of industrialists present at the code authority meeting last March, who, rebelling at the brazen attempt of the administration to force a blanket reduction of hours and an increase in wages upon industry, saved the nation from an error which would have seriously impaired the March to June business expansion. Again the country is indebted to the critics of extreme securities exchange regulation; their voices are responsible for the rule of reason which has marked the activities of SEC to date. Every investor can thank his lucky stars that industry furnished critics courageous enough to challenge the administration's loose talk about submerging the profit motive. Does one think for a minute that President Roosevelt and his followers would have renounced their former dangerous doctrines in regard to profits if it had not been for the clamor set up by critics?

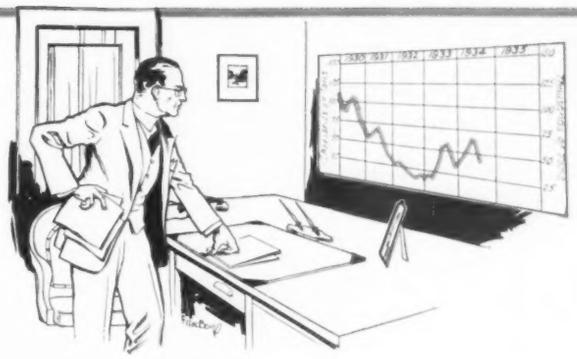
Outspoken, Sincere Criticism by Industrialists Is Major Check Against Radical Influence

It would be possible to enumerate scores of instances in which the voice of criticism has served to deflect the administration from pursuing policies which would have led not only to injury to industry but to the reduction of employment and to the retarding of recovery. In the sense that such criticism is a check against the dangerous influence which theorists and radicals constantly impose upon the President, it is constructive—not only in terms of the public interest but also in relation to its effect upon the Chief Executive. In fact, time may prove that such criticism is the greatest service that can be rendered to the President under present conditions.

For these reasons we cannot agree with executives who advocate a policy of pussyfooting for industry. The high industrial executive who grouses privately but lauds the new deal publicly is not helping his industry, his President or his country.

Now is the time to show the courage of one's convictions!

THE BUSINESS TREND



Business Expansion Slight; Sentiment Is Improved

INDUSTRIAL activity still is fluctuating within a narrow range, with the tendency more upward than downward. Revenue freight car loadings for the week ending Oct. 6 will show only a slight deviation from the 644,647 cars reported in the preceding week. Electric power output totaled 1,659,192,000 kilowatt hours, up a trifle from the last week of September and 0.8 per cent above the comparable figure in 1933. Steelworks operations are slightly more than holding their own.

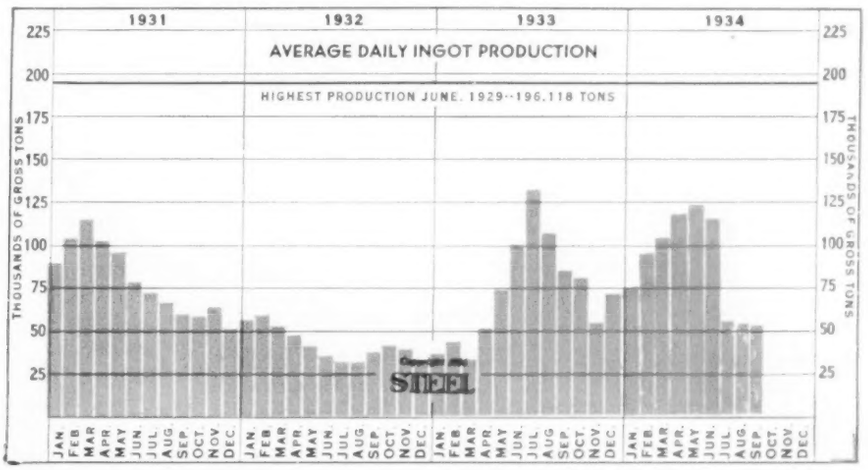
Faint evidence is appearing to show that the reversal of the trend in industrial activity, which occurred in September, is beginning to be reflected in increased employment. Sectional reports show fractional gains in jobs and in payrolls, but the movement is far from general.

Business is watching with interest the expansion of commerce loans by banks. In July of this year, loans of this character made by banks reporting to the federal reserve banks were lower than at any time during the depression. They increased sharply in August and September, but still remain under the corresponding level for 1933. The current bank statements show a high ratio of liquidity, but the holdings of government securities are top heavy. Notwithstanding the abundance of money available for use in industry, it is not in active demand by investors. The ascendancy of the Longs, Sinclairs, Bilbos, Olsons and other radicals not only is discouraging investment, but also is stimulating a mild flight of capital from the areas in which these politicians operate.

Rising Costs May Involve Wage and Relief Policies; Richberg Talks Reassuringly

The cost of living for wage earners, as computed by the National Industrial Conference board, rose 1.8 per cent from August to September. This was the sharpest rise in any month since August, 1933. Continued increases throughout the last quarter would inject another complication into the problems of wages and relief.

Business sentiment continues to improve. Donald Richberg's statements, with some exceptions, have been interpreted as indicating that the administration is trying to placate industry.



1934	Tons
Sept.	50,065
Aug.	50,495
July	58,903
June	115,999
May	124,174

1933	Tons
Sept.	87,811
Aug.	106,058
July	126,734
June	98,632
May	73,201

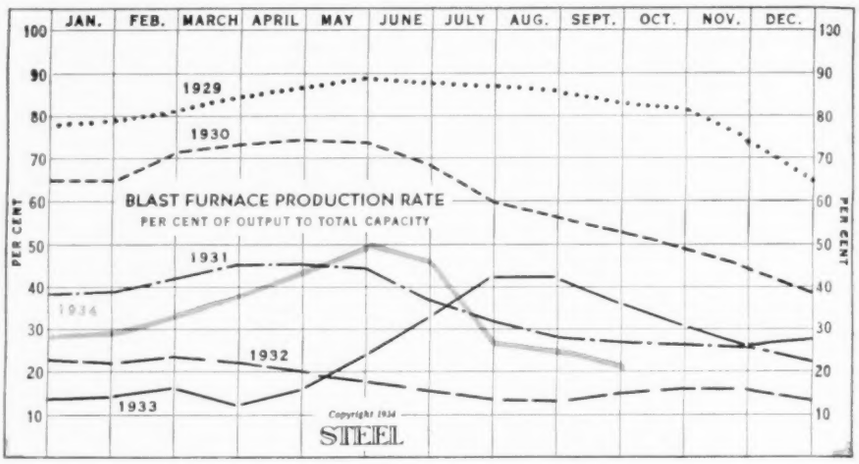
September Iron Output Down; 9-Month Total Above Year Ago

Average daily output of coke pig iron in September dropped to 29,969 tons, a loss of 4230 tons or 12.4 per cent, from the 34,199 tons of August. This is the fourth consecutive monthly decline or a loss of nearly 55 per cent from the daily output of 66,370 tons in May. Despite this severe recession, pig iron production during the first nine months of 1934 has retained a wide margin over the corresponding periods of 1933 and 1932 and almost equalled 1931.

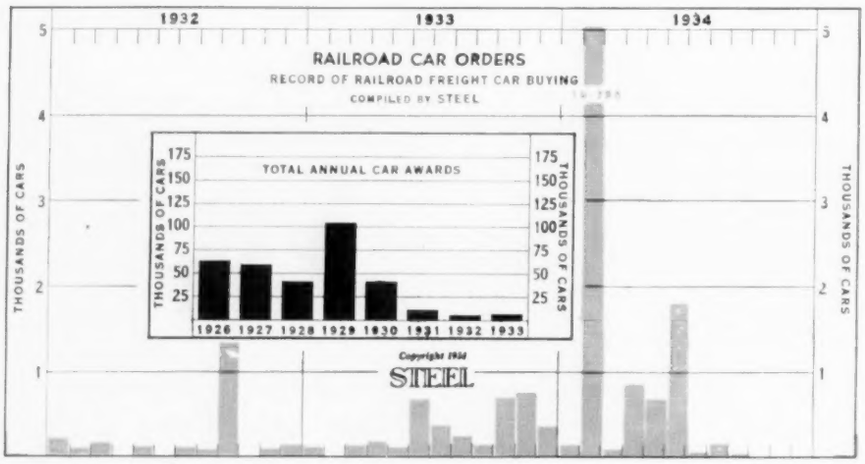
	Tons
September, 1934	29,969
August, 1934	34,199
September, 1933	50,264

Blast Furnace Activity Unchanged in September

Although iron output in September registered a loss of 161,112 tons, the total number of furnaces in operation remained unchanged at 61. Relating production to capacity, the operating rate for September was 21.5 per cent compared with 24.5 per cent in August. The current rate was the lowest since May, 1933, 20.9 per cent. In September, one year ago, operations stood at 36.4 per cent and in 1932 were down to 14.0 per cent.



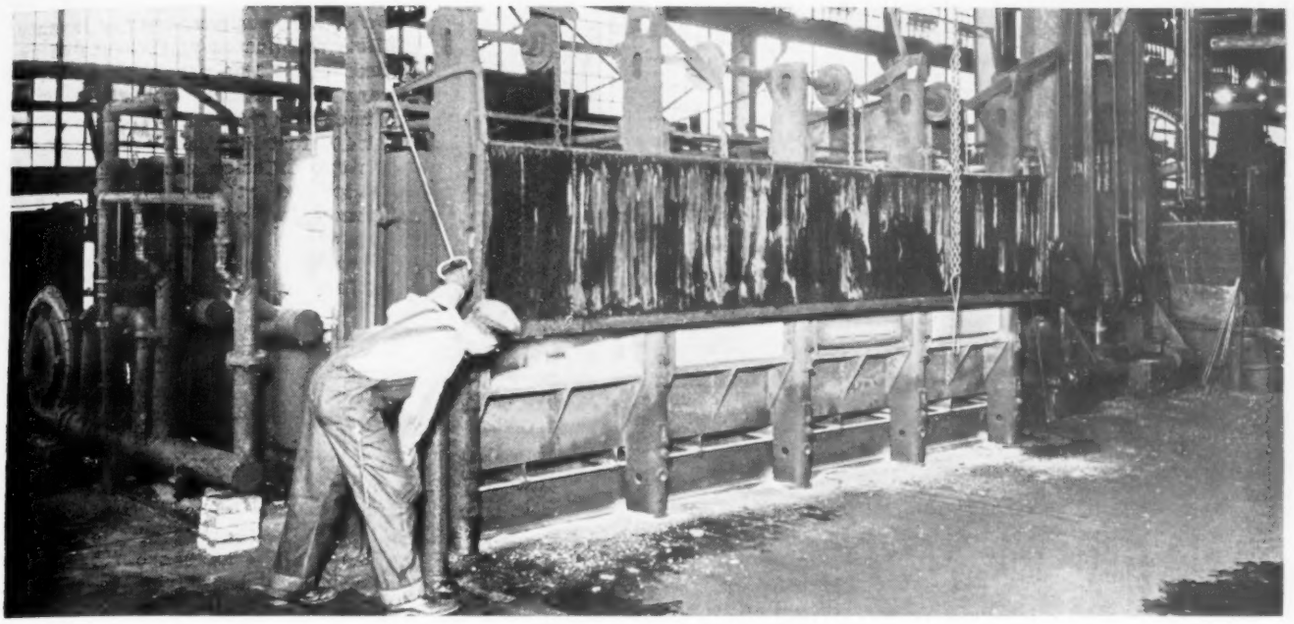
	Per Cent
September, 1934	21.5
August, 1934	24.5
September ,1933	36.4



Freight Car Buying Continues at Low Ebb

Domestic freight car orders in September, involving only seven cars, were the lightest so far this year. They compare with 105 in August, 19 in July and 1835 in June, and brought the total for the first nine months up to 23,390. Awards in September, a year ago, at 23 show very little change. Buyers of rolling stock seem to be waiting the outcome of the freight rate increase petition and some roads have indicated that more liberal buying would follow a favorable verdict on this request.

September, 1934	7
August, 1934	105
September, 1933	23



Gas-fired forging furnace with diffusion-type burners. This unit recently was converted from oil-fired design

NEW TYPE DIFFUSION BURNERS USED ON GAS-FIRED FORGING FURNACES

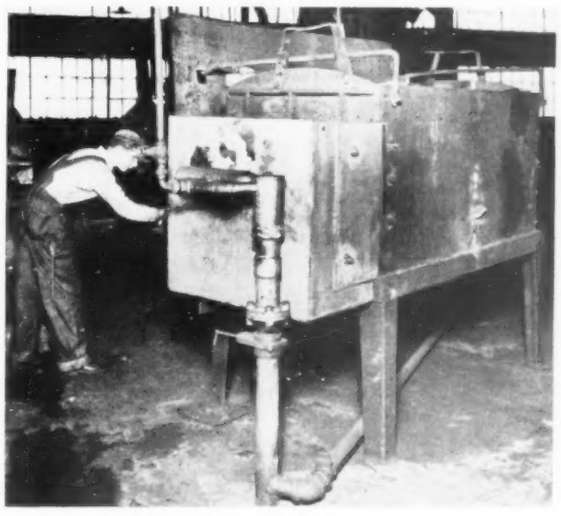
BY J. B. NEALEY

REDUCTION of scaling to a minimum on forging stock, with the aim of improving the product, saving dies and lowering machining costs, is the goal of every forge shop, and good results have been obtained along these lines with gas as fuel in the steel heating furnaces. Among the types of gas burners successful in accomplishing this purpose was the recently introduced diffusion burner. Now there has appeared a new burner, of the same type, with some more or less radical changes in design and operation.

This new gas burner also utilizes the basic principle of alternating layers or strata of gas and air with combustion from their diffusion or intermingling. The idea of the lower strata of raw gas as a protecting blanket for the steel also is retained, but, in some cases, a small amount of air is added.

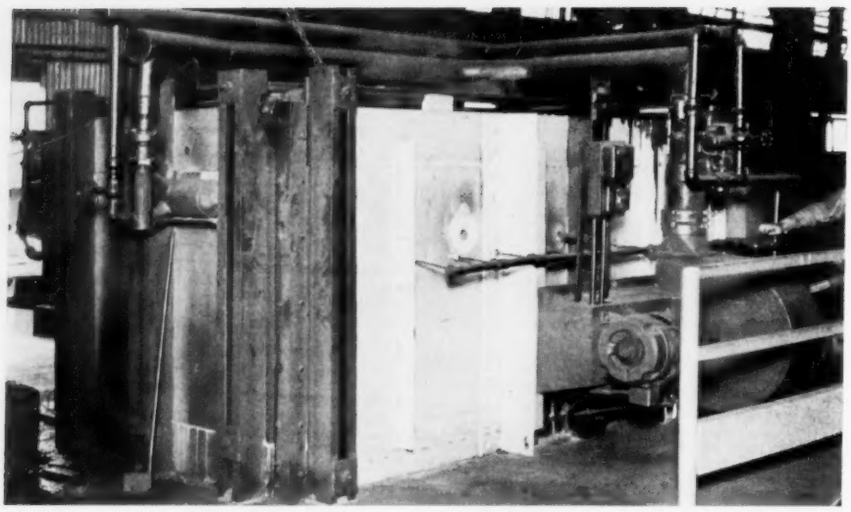
The principal change involves projecting the different strata at different velocities. This is predicated on the fact that there is a direct relation between the ignition velocity of the constituents of the heating gases and the applied velocities of the various strata by which the rate of diffusion and the radiant heat emissivity can be controlled.

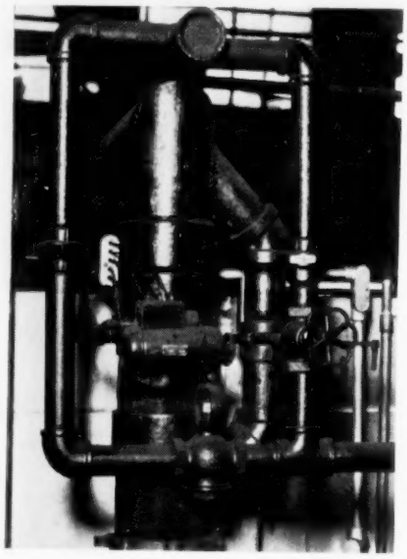
This works out practically by introducing the gas and air, through the burner into the furnace, at the same pressure (10 ounces) the smaller size of the gas orifice giving it the greater velocity.



Small slot-type heating furnace showing simple burner and piping arrangement

Said to be the first to use this new burner is the Transue & Williams Co., Alliance, O. Forgings made by this company range in weight from ¼-pound up to 600 pounds, and the plant has a capacity for approximately 50,000 tons of forgings annually. At the present time work is under way on a modernizing program which includes changing oil fur-





FURNACE and auxiliary equipment feeding diffusion-type burners is shown above. At the right is a closeup of piping and automatic temperature control system for the burners, this equipment being shown at the right of the illustration above

naces over entirely to gas firing.

All heating furnaces are of brick and refractory block construction and are encased in steel. They vary in size and design, one recently converted being 15 x 6½ in size and 4 feet high. It has two doors and is fired with two modified, diffusion-type burners located in one end. These burners are cylindrical in shape and have 6 slots for gas and air, with different mixtures and at different velocities. Instead of projecting a raw gas blanket from the lower slot, 1 per cent air is added. This furnace serves an 8000-pound hammer. A blower furnishes air at 10 ounces pressure to the burners.

Increases Die Life

Here it might be stated that the gas-fired forging furnaces in this plant use from 5000 to 12,000 cubic feet of gas per hour, depending upon size, or 40 cubic feet of gas per cubic foot of furnace volume; the gas consumption per ton of steel is held between 1400 and 2000 cubic feet. This is 1050 b.t.u. gas containing 82 per cent methane and 14 per cent ethane. For diffusion burners and efficient operation, the furnace roof should not be over 18 or 20 inches above the work. The scale is reduced to the practical minimum and where pickling is necessary it is simple, as the scale is loose. It does practically no harm to the dies; in fact, die life has been increased 20 to 21 per cent with gas over oil firing on one particular forging design.

Another furnace, used for heating stock for banjo axles and miscellaneous forgings is of the slot type and is 14 feet long by 5 feet wide inside. Heat is supplied through two diffusion burners, one located on each rear corner, and each with four slots. A raw gas blanket is used to envelop the work which is heated to 2225 degrees Fahr. for forging. This gas blanket is not turned on until after the furnace has come up to heat and has been charged. The burners used are 15 inches long and 8 inches in diameter but the sizes vary with different furnaces. A separate motor blower furnishes air for the burners on each furnace.

This unit has an automatic temperature control and the 8-inch air line and the 1½-inch gas line are placed close enough together so that the same motor will operate a valve in each; simultaneously, a globe valve is used in the gas line and a butterfly valve in the air line. A thermocouple, potentiometer-type controller and recording pyrometer complete the equipment and intermittently operate the motor to increase or decrease the fuel flow by means of the valves when the furnace temperature varies from the degree set on the indicator.

Crankshafts are made from billets 2½ x 2½ x 26 inches in size, heated in a continuous pusher-type furnace. Billets are heated at the rate of approximately 180 per hour and this keeps two hammer crews busy. The furnace is 41 feet long, 4 feet wide and 4½ feet high inside, and is fired with two diffusion gas burners. They are located at the discharge end (counterflow principle), have four rows of slots for gas and air and project flames the entire length of the furnace. A raw gas blanket is used.

These two gas burners replaced 16 large oil burners and the work is now heated with a gas consumption of 2092 cubic feet per ton of steel, including the spacers. If the furnace were used to capacity, decreased in cross sectional area and recuperation added, this could be lowered to 1100 cubic feet. The life of the dies in which these cranks are forged has been increased 21 per cent. The temperature in the preheat zone is 1850 degrees Fahr., while that in the high heat zone is 2300 degrees Fahr. It required five hours to bring the furnace up to temperature with oil and only three hours with gas. The heating rate of the furnace is 52.4 pounds of steel per square foot of hearth area per hour.

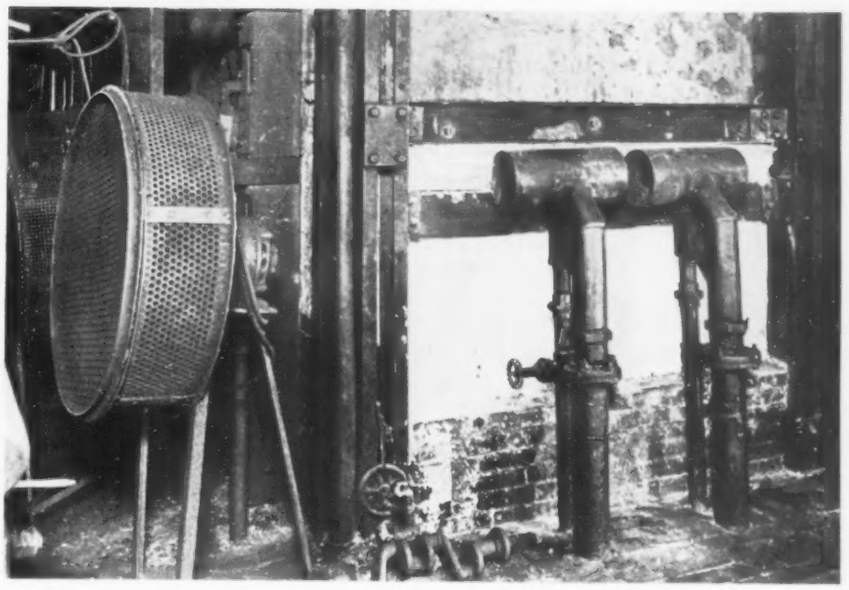
How Older Equipment Is Used

Other furnaces are equipped with older types of nozzle mixing gas burners, but the air still is supplied from a motor driven blower for each furnace. One of these furnaces serves another 8000-pound hammer and is 20 feet long, 10 feet wide and 6 feet high. A refractory wall inside separates the furnace into two chambers, one a third of the size of the other, and there are three doors. Firing is with six nozzle mixing gas burners, three located in each end. A single blower furnishes air for all six burners at 10 ounces pressure through a 6-inch line. Gas at 8 ounces is delivered through a 2-inch line. This furnace is provided with an automatic temperature control similar to the one described.

A different gas burner of the inspirator type, is also used here, as well as on a continuous normalizing furnace. This furnace is 27 feet long by 5 feet wide by 6½ feet high, and has three longitudinal skids on the hearth along which the work, on shoes, is pushed by a motor-driven cam and link mechanism. The shoes are returned to the charging end by a slat-type traveling conveyor. The furnace is divided into three zones, preheat, high heat and cooling, with two burners firing each of the first two zones and four for the third. All fire from one side.

Each of the first two zones, preheat and high heat, is provided with a separate automatic temperature control of the potentiometer type. Air is supplied by blower at 6 ounces

pressure while the gas which is delivered at 3 ounces is reduced to atmospheric pressure in a zero governor. As the air inspirates the gas in a venturi tube, fuel flow regulation is obtained by a motor valve in the air line only. The pusher is on a time clock by which the length of the heating period is regulated. Another continuous normalizing furnace, in which steel stampings are treated, is heated with the diffusion type gas burners. This unit is 26 feet long by 5 feet wide by 3½ feet high, inside, and the conveyor consists of two closed loops of chain, supported between pulleys and motor driven. Stampings are carried through on these chains. Formerly underfired with 14 oil burners, it is now overfired with two diffusion gas burners, located just below the charging door arch. The length of the flame is regulated to the length of the furnace, and the work, traveling in the same direction, is in the furnace only from 1 to 2½ minutes. Heating an average of 5400 pounds of steel hourly with a gas consumption of 2650 cubic feet, figures out at 0.49 cubic feet of gas per pound of steel. The heating rate of this unit will average 41½ pounds of steel per square foot of hearth area per hour.



Continuous pusher-type forge furnace, showing two diffusion burners which replaced 16 oil burners. This furnace heats 150 billets per hour—sufficiently fast to keep two hammer crews busy

Characteristics of Light Metals Listed in Booklet

Service characteristics of the light metals and their alloys have been compiled in a report just issued by the American Society for testing Materials, presenting in convenient, concise form essential technical data and information for aluminum, magnesium and their more importat alloys. It culminates two year's work on the part of subcommittee VII, A. S. T. M. committee B-7 on light metals and alloys, cast and wrought with the American Foundrymen's association cooperating, especially on material relative to casting alloys.

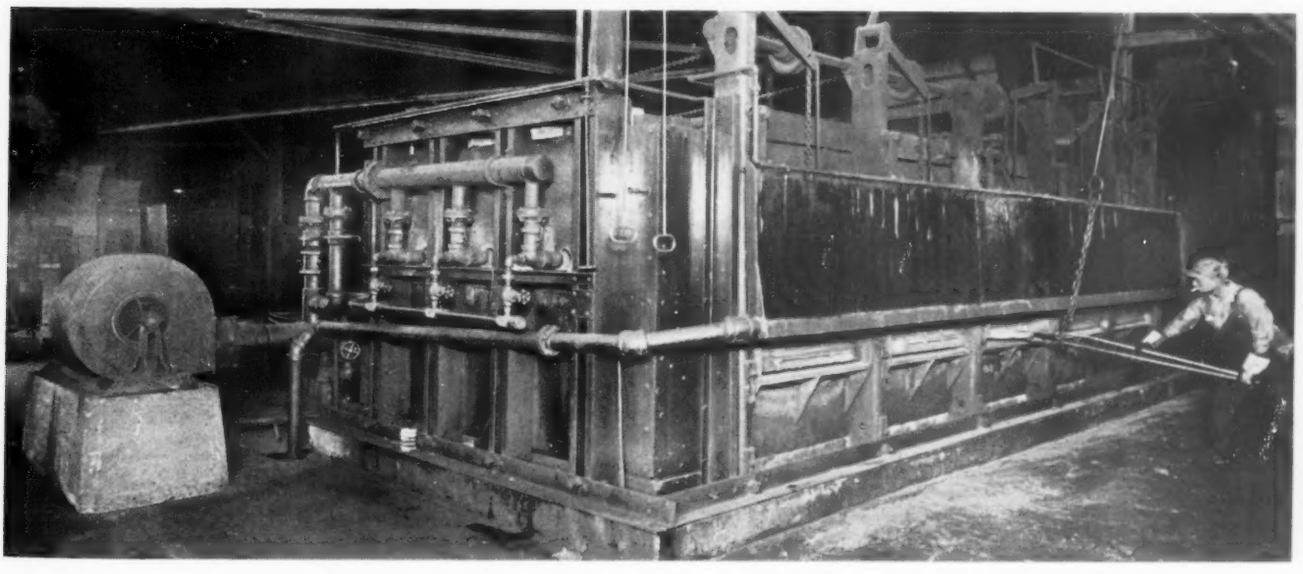
The publication is arranged in four parts; Metallurgical characteristics, industrial requirements, surface protection and tabular data. Under the first named part, there is discussion of chemical composition, heat treatments, welding and the like.

The section on industrial requirements evaluates the usefulness of light alloys in certain fields including aircraft, automotive, general structural and architectural work, railway equipment and others.

While for most applications no surface protection is used, there are times when this is desirable. The discussion in the report covers painting, anodizing or the artificial production of an oxide coating and electroplating. The latter two items apply specifically to aluminum.

The section on tabular data includes 16 extensive tables covering trade designations; nominal compositions; physical constants; typical mechanical properties; and foundry characteristics of casting alloys.

Copies of the 36-page report, in heavy paper cover, can be obtained from A. S. T. M. headquarters, 260 South Broad street, Philadelphia, at 50 cents per copy. The report is the work of A. L. Boegehold, E. H. Dix Jr., J. A. Gann, J. B. Johnson, H. S. Rawdon, Sam Tour, T. D. Stay and J. C. Bowman.



Another large gas-fired furnace for heating forging stock. Burners are of the nozzle mixing type. This furnace also has been converted from oil firing

Vinegar Cleans Galvanized Sheets

HOW should new galvanized sheets be treated before painting? This question is answered as follows in the September issue of *Ingot Iron Shop News* published by the American Rolling Mill Co., Middletown, O.

A simple and inexpensive treatment is to sponge or brush on ordinary vinegar. Vinegar rather thoroughly removes the slick film usually found on newly galvanized sheets. It does not, however, etch the surface like some other treatments. After the vinegar has been applied and allowed to remain on the sheets for five minutes or so, it should be wiped and then the surface of the sheet allowed to dry completely before paint is applied.

Another somewhat similar treatment is the use of 2 or 3 per cent acetic acid solution at a temperature of about 130 degrees Fahr. If it is possible to dip the sheets, or articles made from the sheets, in this solution, allow them to remain there for about 10 or 15 minutes. After removal, they should be thoroughly rinsed and allowed to dry completely.

Still another, even more practical, although perhaps a little more costly, method of obtaining a clean and etched surface is to apply, with an oil-free brush and allow to remain for about 10 minutes, an acidified solution made up as follows: Fifty parts by volume—denatured alcohol; 35 parts by volume—toluol; and 5 parts by volume—commercial concentrated hydrochloric acid (muriatic acid).

This solution should be prepared only as required for immediate use. After the reaction is completed and the surface is thoroughly dried, wash or rinse with clean water to remove any soluble salts that may have formed. Then, allow the sheets to dry thoroughly again before applying paint. This treatment is especially effective if the procedure is followed carefully.

It should be noted particularly that with each of the three methods outlined, it is important that the galvanized surface should be thoroughly dry before painting. A film of moisture between the paint and the sheet would cause poor adherence.

AWNINGS FABRICATED FROM STEEL SHEETS: Typical installation of sheet steel awnings fabricated by W. C. Scott, Metropolis, Ill. This fabricator has made a number of such installations in southern Illinois and western Kentucky, making them in lengths up to 20 feet. Most of them are painted with stripes to simulate the familiar canvas awnings. Purchasers are reported to be highly pleased with them, particularly for their ability to withstand hard storms

s s s

Notes Trend to Black Finish On Household Devices

A leading interior decorator in New York recently stated that the tendency toward the use of velvety black surfaces on accessories such as air refrigerating units, water coolers and the like undoubtedly would soon be reflected in steel furniture made with a steel pipe framework. Such furniture now generally is finished with chromium plate. It is stated by this interior decorator that he did not know of any black finish which would be entirely satisfactory on such furniture for the reason that the finishes with which he was familiar check and crack, and later peel off as a result of the continual flexing of the steel.

s s s

Navy Conducts School for Qualifying Welders

It is estimated that a total of about 650,000 pounds of welding electrodes will be required in building the two heavy cruisers and the four 1850-ton destroyers which the Bethlehem Shipbuilding Corp. has under contract from the United States navy. The peak labor load will include about 200 welding operators. To train a sufficient number of competent welders, the company has set up a welding school at its Fore River plant. This school is conducted by the foreman of the welding department and about 200 hours of training are required to develop an operator sufficiently to pass the qualification test. The course is carried out in accordance with a welding manual developed at the plant and

which contains the following chapters: Metallic arc welding, fundamentals; general safety precautions; how to run a bead; handling the arc; placing the arc accurately; filling craters smoothly; flat tee joint; flat lap joint; flat vee butt; flat single vee butt; running bead on inclined surface; running bead on vertical surface; vertical tee joint; vertical tee butt; laying a bead overhead; overhead tee joint; overhead single vee butt; horizontal lap joint; vertical lap joint; overhead lap joint; filling holes; flat thin plates; vertical and overhead thin plates.

\$ \$ \$

Cylinder Gas Used For Air Tools

FOR replacement riveting or drilling, where the job is too small to warrant setting up the customary air compressor installation, compressed air or nitrogen, in cylinders, is being used to some extent, particularly in the Cleveland, New York and Philadelphia districts.

With a pressure of 2000 pounds per square inch, a standard 200-cubic foot nitrogen cylinder is capable of releasing 902,000 foot-pounds of energy in pure adiabatic expansion, or 2,062,000 foot-pounds in pure isothermal expansion, the former relating to rapid release of pressure and heavy volume flow, and the latter to very small volume delivery. In the riveting hammer, conditions approach adiabatic expansion. A fair estimate of the available energy per 200-cubic foot cylinder is 990,000 foot pounds, equivalent to 1 horsepower for 30 minutes or 30 horsepower for 1 minute. Working at 80 to 100 pounds gage pressure in the standard riveting hammer, the 200-cubic foot cylinder is exhausted in approximately 6 minutes driving time; the average rate of work is equivalent to that of a 5-horsepower engine.

In applying cylinder gas to the standard riveting hammer or air motor drill, the equipment needed includes a suitable pressure regulator, a length of 5/16 or ½-inch pressure hose, a suitable adapter to fit the hose to the compressed air tool and a cradle for supporting and transporting the cylinder on the job. The regulator is set for the required air pressure of the tool and the riveting or drilling operations performed as with machine compressed air.

This method is suitable for use not only on small jobs, but on jobs where the cost of piping compressed air would be prohibitive. It also is useful where lack of space prevents the use of standard practice.

In a railroad bridge repair shop this method was used recently. One cylinder of compressed nitrogen drove 25 ⅞-inch rivets in 12 minutes at a cost of \$2.93, or an average of \$0.117 per rivet, of which \$0.092 was for gas and \$0.025 for labor. On the basis of 100 rivets, driven by a 4-man gang in 48 minutes, the cost of driving with cylinder gas totaled \$11.70.

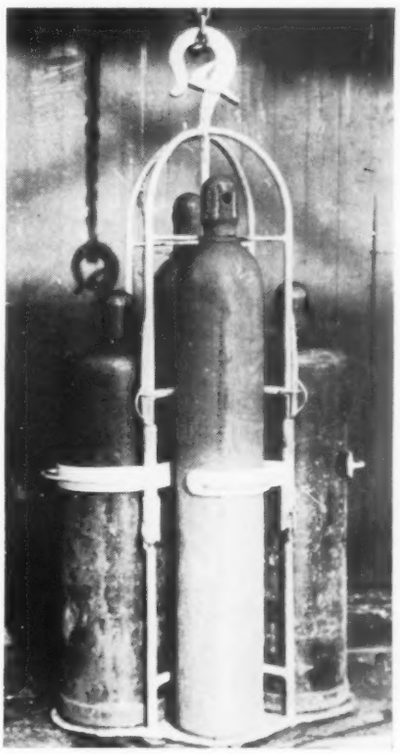
\$ \$ \$

Designs Compact Carrier Frame

FOR transporting oxygen and acetylene by means of traveling cranes, an eastern shipyard recently constructed a carrier frame, as shown in the accompanying illustration. It is made of ½-inch standard galvanized pipe welded to a ⅜-inch galvanized steel base plate.

Retaining bands are made to accommodate two oxygen and two acetylene cylinders. They turn on pipe hinges and are locked in position by slots 2 inches long, engaging on pieces of flat bar section welded to the carrier frame. The cylinders are held in the locked position by safety catches of flat spring steel with handles. Release is effected by pulling out the safety catch and lifting the bands 2 inches to clear the locking device.

The top hook is made of forged steel and is fitted with a device designed to prevent the hoisting chain unshipping if any obstacle is encountered in the lowering of the carrier.



Carrier, as loaded with two oxygen and two acetylene cylinders, all securely locked in place and the safety catch set to prevent unshipping of the crane hook

Flanged Spouts Welded To Teakettles by Torch

A manufacturer of enameled steel tea kettles has developed a method of putting spouts on the kettles by means of oxyacetylene welding and without using a filler rod. The new method is to put a 3/64-inch flange on the spouts and by means of jigs hold them against the kettles. It is found that the best results are obtained by holding the spout loosely against the kettle rather than bracing it against the latter. Nos. 25 and 27 gage sheets are being used in making these kettles and spouts.

\$ \$ \$

Use of Soap on Condensers Aids Drop Collection

Coating surfaces of condensers with soap is said to make them better drop collectors. This is the opinion of engineers following experiments with oleic and stearic acids which are important ingredients in soap. A thin film of either of them on copper, brass, nickel, or stainless steel was found to increase misting. These acids do not wash off easily and it is possible that as a result of these experiments considerable reduction in the size of surface condensers may be possible.

\$ \$ \$

Chrome-Plated Dies Provide Better Drawing Surfaces

Dies for forming sheet and strip steel sometimes are chromium plated. This finish provides a surface having high wear resistance, but it does not add to the strength of the die. It has the property of adding slipperiness to the surface which allows the work material to be drawn over it more easily under the action of the press. Chromium plating is particularly advantageous for stainless steel stampings.

\$ \$ \$

Worn Piston Heads Built Up By Bronze Welding

Building up worn cast-iron locomotive piston heads by using manganese bronze welding rods in conjunction with the oxyacetylene torch is found by one southern railroad not only to save two-thirds of the original cost of the new head, but to result in a longer

wearing head. When the wear-tolerance limit has been reached, this road restores the piston head to the original center line of operation by building up its surface with managanese bronze welding rods, and then machining them to accurate diameter and fitting them with new piston rings. The cost of new piston heads for this road is about $30 each. The complete cost of building up the worn surfaces is about $10 per head. The road finds that whereas a new piston head will give 22,000 to 30,000 miles of service, depending on the service conditions, the life of a built-up piston head is substantially 25 per cent greater.

Spherical Fluid Storage Tanks Are Assembled from Dished Plate Segments

CONSIDERABLE skill is required in fabricating the various steel plate segments which, when assembled, form the Hortonsphere, a spherical container built by the Chicago Bridge & Iron Works, Chicago, for the storage of fluids under pressure. Since the introduction of this type of holder about 12 years ago, numerous installations have been made for the storage of gasoline and natural, butane and manufactured gas.

In fabricating, the plates are laid out so that each forms a certain segment of the sphere and then are cut to shape by shearing. The next process is to form these sections on a special dishing machine which gives them the proper curvature. This work is done cold.

Differing from a simple stamping process which shapes metal with one stroke of the plunger, operation of the dishing machine involves gradual working of the plate, portion by portion, until the desired radius has been obtained. Templets are used to guide the operator in forming the pieces, and success of this operation depends largely upon the skill and experience of the workmen.

Edges of the segments are punched, if riveted construction is to be employed in assembly, or are prepared for welding in the event of the latter type of union. The fabricated plates are shipped out and the installation is erected in the field.

Many Now in Service

More than 100 Hortonspheres now are in service in the gas and petroleum industries. Installations for liquid storage, such as natural gasoline, usually are built in 5000 and 10,000-barrel capacities and are designed for pressures of from 20 to 50 pounds per square inch. Standard capacities for gas storage are 32 to 60 feet in diameter, such units being built for pressures of 20 to 100 pounds per square inch.

Volatile liquids are stored in a tank that will withstand internal pressure in order to prevent evaporation loss. As long as the pressure in the tank does not exceed the setting of the relief valve, no loss occurs. When these containers are used for gas storage, the gas is pumped into the tank under pressure and feeds back into the distribution system as needed. Weight and plate thickness of the container is regulated by the service pressure.

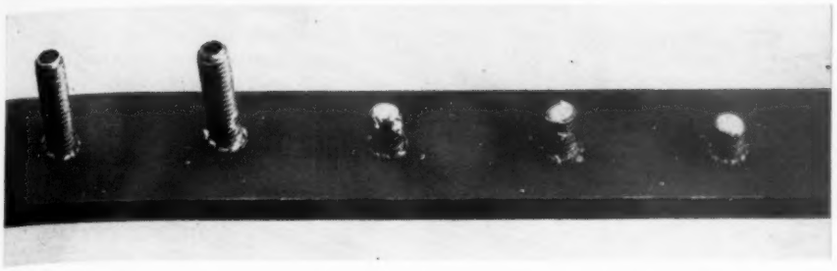
HORTON-SPHERE for the storage of natural gasoline at the Empire Oil & Refining Co. plant at Ponca City, Okla., with capacity of 5000 barrels and designed to operate at a pressure of 50 pounds per square inch

Studies Structural Steel Under Fire Conditions

The extreme importance of proper fire protection of load-bearing steel columns in a building and the influence of the proportions of the column and of the metal used on the column's ability to bear its load during a severe fire have been brought out by a number of tests at the national bureau of standards, Washington, test specimens about 10½ inches long with flat ends being used.

The specimen was enclosed in a specially designed furnace in which the temperature could be controlled and measured accurately. The specimen in the furnace was subjected to a compressive load which also could be controlled and measured. Tests were made either by bringing the specimen to a constant temperature and then applying increasing loads and noting the changes in length until failure occurred or by maintaining a known constant load on the specimen and raising the temperature continuously and again noting the changes of length until failure occurred. In the constant-load tests the specimen expanded when first heated but as heating was continued a temperature finally was reached at which it began to shorten.

Since the specimens were tested in compression it was to be expected that the load supported per unit area of section of the column would depend greatly upon the shape, thickness of parts, and ratio of its length to lateral dimensions. The slenderness of the specimens is expressed in terms of the ratio l/r, where l is the length of the specimen, and r is the least radius of gyration of the cross section. The values of l/r for the various specimens ranged from 20 to 150. Specimens of structural-steel shapes and round bars were used, the diameters of the bars ranging from ¼-inch up to 1⅞ inches. Some cast-iron specimens also were included. The heavier steel specimens were stronger at 482 degrees Fahr. than at room temperature. In general the test specimens failed to carry the loads for which the steel columns originally are designed, at temperatures from 986 to 1166 degrees Fahr. The load which a given column would carry at any temperature in the range 932 degrees to 1175 degrees Fahr. can be represented by a fairly simple empirical formula.



Five studs welded by New York Shipbuilding Corp. with automatic stud welder. The two at right appear as welded. The three at left were turned off by a wrench applied to nuts applied over washers

Steel Studs Welded Into Steel Surfaces By New Portable Electrical Unit

A PORTABLE stud welder, comprising welding transformer and control mounted in a portable steel cabinet, primary and secondary cable, and a stud-welding gun, has been made available by the General Electric Co., Schenectady, N. Y. The stud welder is used in fusing the end of a stud into a metal surface. Applications include welding of studs to steel surfaces for hanging piping, conduits, signs, instruments, hooks, and insulating materials.

A stud is placed in the welding gun, pressed against the surface to which it is to be welded, and one automatically-timed impulse of power completes the weld.

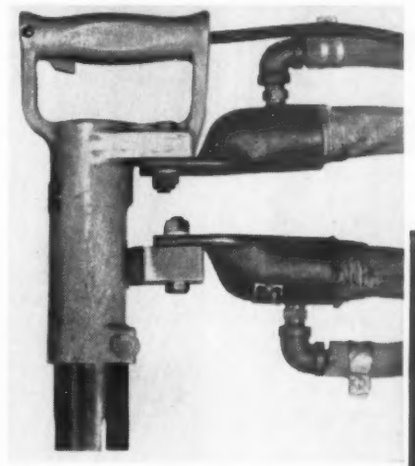
One side of the portable steel cabinet is equipped with split steel doors which gives access to the control panel. Opening the upper door automatically removes power from the panel; adjustment of current and time for different sizes of studs are made with this upper door open. The lower door is used for servicing and normally can be kept locked.

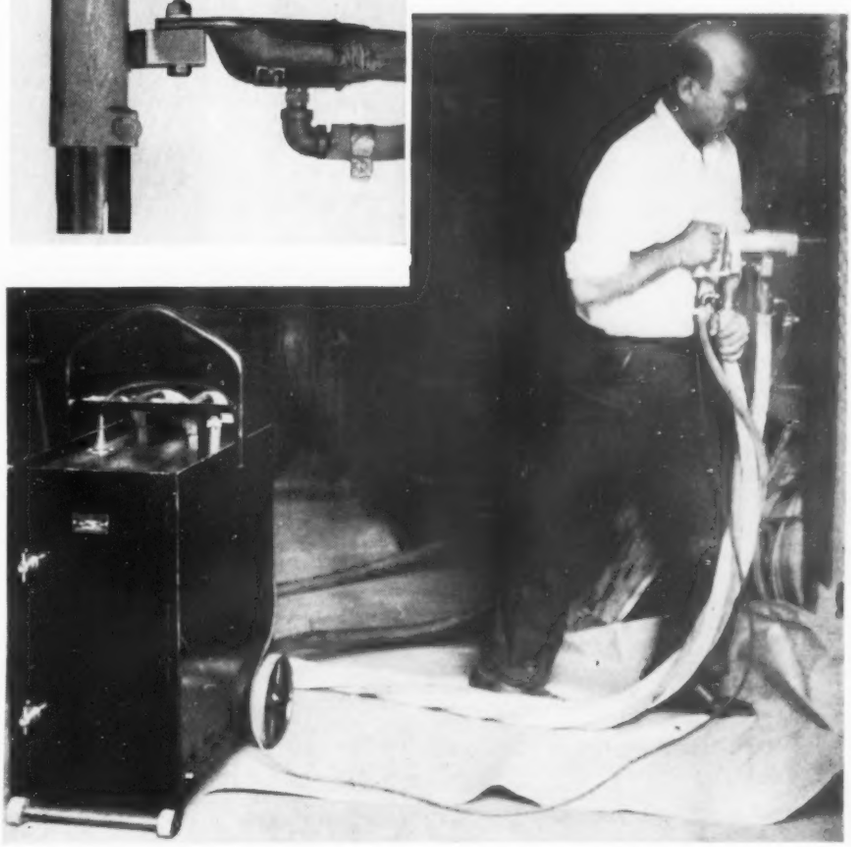
Cables Are Air Cooled

The transformer is mounted in the cabinet behind the control panel and is connected to the power supply through a 20-foot, double-conductor, drag cable. The secondary of the transformer supplies heavy current at low voltage to the welding gun through hollow, flexible cables which are cooled by forced air. The cooling air is admitted at both ends of each cable and is allowed to bleed out over its entire length. The secondary windings of the transformer are also cooled by forced air, permitting the use of the minimum of material for a given capacity; in this manner the maximum degree of portability is obtained. The weight of the complete unit, less the cables, is approximately 500 pounds.

The welding gun is a tool for holding the stud against the work under spring pressure, and for properly directing the welding current. The gun is light in weight, most parts being of aluminum, and will accommodate studs of from ⅛ to 5/16-inch in diameter and from ½ to 2½ inches long. A control switch in the spade-type handle of the gun controls the operation of an automatic timer located on the control panel. When the gun switch is closed, current flows for a definite period of time only, regardless of how long the switch is held closed. The timer is adjustable for periods of from 1/12 to 5/6 second, the exact time used depending on the size of stud being applied. Once adjusted, the timer repeats the desired duration of current flow for each weld.

The new stud welder is obtainable for single-phase power supplies of from 25 to 60 cycles, at 110 to 550 volts.





Portable stud welder with air-cooled cables and steel welding gun. The gun, shown in clearer detail at upper left, is operated by low-voltage current through hollow, flexible cables cooled by forced air

Gold-Clad Stainless Strip Steel in Production

General Plate Co., Attleboro, Mass., is producing gold-clad stainless strip steel. The product now being produced has a layer of 18-karat gold on one side and 14-karat on the other. The stainless steel is the so-called RA grade, containing 16 per cent chromium, made by the Ludlum Steel Co., Watervliet, N. Y. The General Plate Co. welds the gold on the stainless steel billets and rolls the resulting composite billets into the final gold-clad product.

Consider Use of X-Rays in Connection with Metals

X RAYS provided the chief topic for consideration at one session of the American Society for Metals during its annual convention in New York, Oct. 1-5. Three of the four technical papers presented at this session bore directly on this subject.

Starting this session with a paper on grain distortion in metals during heat treatment, C. Nusbaum, associate professor of physics, Case School of Science, Cleveland, and N. P. Goss, physicist, Cold Metal Process Co., Youngstown, O., stated that in Laue photographs of heat treated metals the diffraction maxima often are diffuse and very much elongated. This phenomenon can be explained readily by considering that the grains during treatment are not growing freely but in such a manner as to become more or less distorted during the process of growth.

The authors presented a number of X-ray photographs to illustrate the most important factors which determine the presence or absence of distorted grains in heat treated metals. They gave as some of the factors which determine the freedom from or the presence of distorted grain growth as: (1) Degree of cold work; (2) chemical composition; (3) temperature of treatment; and (4) length of time of treatment.

New Exposure Factor Used

Workable X-ray exposure charts for steel were contained in a paper presented by Herbert R. Isenburger, St. John X-Ray Service Inc., Long Island City, N. Y. These charts were predicated upon a new exposure factor which is based on the actual density of the material and on the greatest thickness to be penetrated. To obtain the correct time of exposure, the speaker stated that the following six factors must be taken into account, namely: Wave length of radiation; intensity of radiation; focus-film distance; scattering of radiation; absorption of radiation; and length of area to be X-rayed.

The voltage determines the wave length, and milliamperage the intensity of radiation. The inverse square law determines the time factor if the focus-film distance is the only variable. Scattering can be taken care of by proper shielding. Absorption, in turn, depends upon (1) thickness of the material, (2) the atomic number and wave lengths, and (3) number of atoms per unit volume. The atomic number depends upon the elements of which the material being tested is composed. Hitherto, the specific gravity has not been taken into account, nor has the influence of the actual thickness to be penetrated by the X-rays at the end of a film been considered in the construction of exposure charts. Mr. Isenburger's paper, therefore, discussed these problems briefly and presented a solution of the difficulties.

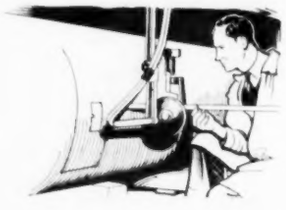
In discussion of this paper, H. H. Lester, Watertown Arsenal, Watertown, Mass., pointed out that Mr. Isenburger's charts are of great convenience and importance to the practical radiographer. He suggested that they should be prepared to such scale that they could be hung on the laboratory wall. Practice at Watertown Arsenal, and probably in most laboratories, he continued, has been to make a pilot exposure in all cases. Usually this exposure is nearly correct and the film is usable; however, it sometimes becomes lost.

Providing for Curved Surfaces

Mr. Lester pointed out further that in many cases, probably in 50 per cent of the cases in his own laboratory, the surfaces of the metal to be examined are curved. Charts cannot very well provide for the varying degrees of curvature, consequently it appears that cut-and-try methods must still be employed.

In another comment, John T. Norton, department of mining and metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., stated that the influence of small changes in density and in effective thickness becomes very considerable when translated into terms of exposure. Mr. Isenburger did not state exactly how the so-called exposure factor is calculated, but obviously this accounts only for the increased thickness of the object when penetrated by an oblique ray. There should be another factor, said Mr. Norton, which corrects for the increased target-to-film distance at the ends of the film. This factor may influence the exposure by more than 10 per cent.

The treatment of density variations in the sample as equivalent thickness variations makes a simple and straight-forward method of handling. The only difficulty here, continued the speaker, is the fact that accurate values of the density seldom are available. The operator hardly could take time to make an actual determination and his estimate might be considerably in error. Probably quite as consistent results would be obtained by simply having two factors for correcting the basic exposure chart, one for cast steel and the other for wrought steel.



Experiment has shown that single crystals of silicon steel or pure iron have extremely low hysteresis losses in certain crystallographic directions; however, such single crystal structures have the disadvantage of having exceedingly high eddy current losses when used in alternating current apparatus, as transformers, for example. A paper by N. P. Goss, physicist in charge of metals research, Cold Metal Process Co., Youngstown, O., described a new electrical strip steel which is fine grained and has properties approaching those of a single crystal.

Properties of Fine Grained Steel

According to the author, this steel contains up to 3.5 per cent silicon and the properties are obtained by the proper distribution of hot rolling, heat treating and cold rolling. The whole idea is based on a radical departure from present-day theories regarding the ferromagnetic properties of single crystals and fine grain aggregates. The final strip is characterized by a grain structure in which the crystals are quite perfect in structure and are distributed entirely at random and the magnetization curves of these fine-grained aggregates have the same symmetry and magnitude as the single crystal of the same substance. The paper showed in some detail the principles which must be adhered to in order to develop single crystal properties in this steel.

The hot rolled strip of proper characteristics is heat treated, cold rolled to an intermediate gage, heat treated, cold rolled to final gage, and again heat treated at a temperature around 2000 degrees Fahr. Mr. Goss stated that the X-ray has been of great value in following the effect of time of heat treatment on the strips in the various stages of processing. In general, it was found that in every case where the final materials exhibited a high magnetic moment and those in which the crystal structures was well developed gave the best results.

This paper was discussed by various people and the research work was highly complimented, however, all pointed out further lines of investigation to throw light on phases which are contrary to present understanding. Jakob Kunz, Urbana, Ill., stated that the results are as important as they are surprising. It has so far been known that high

permeability is connected with single crystals of very pure metals. Here on the contrary high permeability is found in a steel containing over 3 per cent silicon in a fine-grained crystalline aggregate.

With respect to the crystalline aggregate there arise important questions which have not yet been answered, continued Mr. Kunz. For instance, if two perfect single crystals were joined along a certain surface, how would this intermediate surface affect the magnetic properties? And if the two crystal surfaces meet at an angle, what is the nature of cementing material between the two surfaces? This material might be amorphous or crystalline. In the case of the iron-silicon steel of Goss, the magnetic properties of the elementary crystals do not differ much in different directions, so that if the elementary crystals form an aggregate, the magnetization in a given direction may be about the same as for a single crystal, especially if the material between the crystals is crystallized also. Moreover, the question arises as to the role of silicon. It may serve only to purify the iron from oxygen or it may enter into the gratings of the crystals.

Rolling Process Determines Much

S. R. Williams, Amherst college, Amherst, Mass., declared the work of Mr. Goss has completed the overthrow of ideas about the orientation of crystal structure as an all important factor in high permeabilities. It appears that the rolling process is the chief factor which determines the magnetic properties found by the investigator. Several further lines of investigation should be followed, said Mr. Williams. The rolling and heating processes may give random distribution to the crystals, but it does not preclude a preferred orientation of a series of planes of cleavage (joints) between the crystals. The rolling process accentuates these slip planes, which in turn affects the hardness of the material. Mechanical hardness is most intimately associated with the magnetic properties of materials. These relations call for a comprehensive study.

Also the effects of longitudinal and transverse joints in ferromagnetic substances should be investigated more thoroughly. They play a most important part in the behavior of metals. Furthermore, said Mr. Williams, in the theories of hardness much is said about the material between the slip planes. What are its magnetic properties?

N. A. Ziegler, power use research department, West Penn Electric Co., Pittsburgh, pointed out that it would be desirable for Mr. Goss to give an explanation as to what happens inside his material, which is responsible for these good magnetic properties. The belief so far is that the regularity of the space lattice is the principal factor which determines the maximum permeability and hysterisis loss of magnetic materials. This regularity of the space lattice could be destroyed, with a consequent effect on the magnetic properties, by one of the following three factors: Mechanical distortion; distortion at the grain boundaries; and distortion produced by the foreign elements—impurities. So far the experimental evidence has been in the favor of this opinion, and for this reason efforts have been concentrated on eliminating these three factors to produce improved grades of magnetic materials.

An extensive discussion of Mr. Goss' paper was contributed by W. E. Ruder, research laboratory, General Electric Co., Schenectady, N. Y. Mr. Ruder contrasted the work done by his company with that of the author and pointed out numerous exceptions.

This session was concluded with a paper on cutting temperatures developed by single-point turning tools by O. W. Boston, director, and W. W. Gilbert, instructor, department of metal processing, University of Michigan, Ann Arbor, Mich. This paper covered an investigation in which a single steel was cut by a single tool bit. Temperatures were determined by the tool-work thermocouple method for each of numerous conditions of tool shape, depth of cut, and feed. The effect of such elements as nose radius, side cutting angle, side rake angle, back rake angle, depth of cut, feed, and cutting speed on the temperatures were determined.

In discussion, W. H. Oldacre, director of research and engineering, D. A. Stuart & Co., Chicago, complimented the authors of this paper on their work, which, he said, was of outstanding interest to his company as a manufacturer of cutting lubricants. The question as to whether cutting fluids function as lubricants or coolants is still an open one, although the federal government is at present collecting a tax of 4 cents per gallon on the assumption that they are lubricants. He stated a hope that Dr. Boston would continue his work and provide data regarding the effect of lubricants on operating temperatures as determined by the method described in the paper.

Design of Welded Structures Requires Specific Study

INTERESTING conclusions from an investigation of welded seat angle connections, were contained in a paper by Inge Lyse and N. G. Schreiner, Fritz engineering laboratory, Lehigh university, at the annual meeting of the American Welding society in New York, Oct. 1-5. Study covered the use of such connections in both building and engineering construction, and used in two ways; one as supports for beams during erection and as load carrying members.

The tests covered angles ranging from 4 x 4 x ½-inch up to 8 x 4 x 1-inch, and fillet welds from ⅜ to ⅝-inch thick. All of the angles were 8 inches long and all the welds stretched the full length of the vertical legs, that is, 4, 6 and 8 inches.

Conclusions from the test results were as follows:

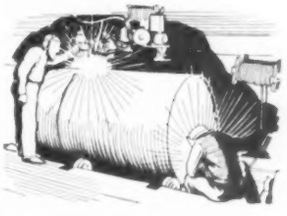
The strength of a seat angle connection with welds at the ends of the vertical leg of the angles varies roughly as the square of the thickness of the angle, directly as the effective lever arm of the resultant reaction, and is influenced by the length of the vertical leg of the angle, and the size of the weld. Any design method should take these factors into consideration.

Vertical shear has only a slight effect on the strength of the weld unless the angle is thick enough so that the bending deflection of the vertical leg is reduced to a minimum, in which case the vertical shear is a criterion. However, even in this case the tops of the welds were found to be most highly stressed and failed first.

Centers of rotation for the calculation of the resistance of the weld were not located in these tests but it was evident that they were not at the mid-height of the weld. They probably vary with the effective lever arm of the applied load and with the load itself.

The outstanding leg acts as a cantilever beam so long as the load is applied near the toe. As the load moved in toward the heel of the angle, true cantilver action is replaced by a combination of bending and vertical shearing stress giving a point of maximum principal stress on the fillet of the angle.

Increase in size of weld increases the strength of the connection but



not in proportion to the gain in weld strength; furthermore, the added strength of the connection is far less than the increase in welding costs. Economically it would be desirable to keep the weld as small as possible.

Strength of the connection does not increase markedly with the length of the weld. It is probable that the weld need be only slightly longer than is necessary to prevent shear failure, figured simply as the total load divided by length of weld. It appears evident that the bending moments set up add no appreciable stresses to the lower portion of the welds.

Failure of the welded seat angle connection is gradual unless the lever arm is so small that shear and not bending predominates. The weld gradually pulls away from the top, allowing the angle to bend outward and downward at a rapid rate.

With due regard for the variables studied and the results obtained in this investigation, seat angles should be so designed that the outstanding leg resists the bending stresses set up by the reaction, while the weld is designed to resist vertical stresses.

Results of a photoelastic study of these same welded seat angle connections were set forth in a companion paper presented by Inge Lyse and Douglas M. Stewart, Lehigh university, and submitted by Mr. Stewart. Confirming the results reported in the preceding paper, he added a number of supplemental conclusions.

Designs for Welding Need Study

In discussing these papers, Dr. D. S. Jacobus, president of the society, voiced the opinion that more attention should be given to the development of best designs for welding, rather than to adapting welding to sections originally designed for riveted points. Leon S. Moisseiff, presiding at this session, expressed the belief that the conclusions in these two papers justified attention on the part of steelmakers to the possibilities involved in rolling special sections for welded construction.

A complete report of an examination of welds made under field conditions for high-pressure, high-temperature steam station piping was contained in a paper prepared by A. E. White, University of Michigan, and D. H. Corey and C. L. Clark, Detroit Edison Co. These welds were in main and auxiliary superheated steam piping systems operating at 650 pounds per square inch, 850 degrees Fahr. and boiler feed piping systems operating at 1000 pounds per square inch and 385 degrees Fahr. The main superheated steam piping was especially noteworthy in that there were no flanged joints between the superheater outlet header and the inlet end of the turbine stop valve; all valves except the turbine stop valve were welding-end type.

Two welds were involved, a pipe-to-pipe weld and a pipe-to-casting weld. The pipe was seamless steel of the following analysis: Carbon, 0.33; manganese, 0.75; silicon, 0.06; aluminum, 0.04 (metallic); chromium, 0.06; phosphorus, 0.01; and sulphur, 0.02 per cent. The casting used was a 16-inch ring of the same wall thickness as the pipe and of the following analysis: Carbon, 0.24; manganese, 0.62; silicon, 0.36; chromium, 0.82; nickel, 1.19; and molybdenum, 0.40 per cent. Electrodes were of mild steel with an organic coating. Following deposition of each bead of weld metal, the weld was cleaned with a chipping hammer and suitable chisels. In completing the pipe-to-pipe weld 7 beads were deposited, using 5/32-inch diameter electrodes and 7 beads with 3/16-inch electrodes.

Welds Were Stress Relieved

Pipe-to-casting welds required one bead of 5/32-inch diameter electrodes and 11 beads of 3/16-inch diameter electrodes. Welds were stress relieved by heating a circumferential band containing the weld to a temperature of 1100 degrees Fahr, holding that temperature for one hour and cooling in still air. Electric heaters of the induction type were employed. Results of tests, set forth in detail, in the paper, showed the welds to be entirely satisfactory. The job described was at the Detroit Edison Co.'s Connors creek power house.

Whether stress relieving of the welds was necessary in this installation was the subject of some controversy following the reading of the paper. One speaker thought such procedure a waste of time and money. Dr. Jacobus concluded this controversy with a rather lengthy extemporaneous talk in which he cited cases where stress relieving in installations of this kind put an end to failures which had been occurring when the joints were not stress relieved.

Complaining that there is a big gap between what the colleges teach in their welding courses, and welding in industry, J. H. Zimmerman, Massachusetts Institute of Technology, told of the work being done at that institution to train men so that they can engage actively in welding after graduation without taking a subsequent course in some industrial welding plant.

IN A session devoted to fundamental research in welding, much interest was aroused by a paper by Prof. R. E. Jamieson, McGill university, Montreal, Que., describing the method employed at that university in the measurement of certain residual elastic stresses in arc-welded steel plates. The paper gave measurements of the total deformations caused by welding, and showed that the total deformations consist partly of plastic flow and partly of elastic deformation. Information on the relative effect of stress relieving was presented, on the whole showing that stress relieving brings about an improvement.

In view of the keen attention now being given to the subject of stress relieving, Prof Jamieson's results were regarded as of much importance and as having great suggestive value. In discussion, Dr. D. S. Jacobus, president of the welding society, declared the paper was of value in indicating where stress relieving should be done; he also considered it valuable for use in formulating codes containing stress relieving provisions. Prof. Jamieson uttered a caution with respect to using his results in codes, saying they represented work on only a few test specimens.

In most welds conditions for severe stressless corrosion are ideal. What results might be expected if this ideal condition for stressless corrosion were supplemented by fatiguing stresses? It was the desire for an answer to this problem which led to a joint paper presented by Wilber E. Harvey, John A. Roebling's Sons Co.; Arthur J. Ciastkewicz, J. G. Brill Co.; and F. Jerome Whitney Jr., Lehigh university.

After careful consideration of various corrosive media, water was decided on, in view of the fact that it is the corrosive agent most frequently encountered in industry. A rotating-beam type of fatigue machine was used in all tests. The water was applied in a constant stream directly upon the plane of maximum stress, which in every case was the location of the weld..

Welds Resist Corrosion Fatigue

Results showed that the corrosion-fatigue limit of unwelded 18-8 stainless steel is about 5000 pounds per square inch higher than the fatigue limit in air of the unwelded material. The corrosion-fatigue limit obtained on resistance welded material was about 6000 pounds per square inch higher than for the unwelded material and about 11,000 pounds higher than for the unwelded material in air. Atomic hydrogen welded specimens showed corrosion-fatigue value of about 28,000 to 29,000 pounds per square inch, or about 5000 pounds lower than the value for the unwelded material. Gas-welded specimens showed unusually low corrosion-fatigue limit, about 10,000 to 12,000 pounds per square inch.

It would appear, the authors concluded, that if a welded section of 18-8 stainless steel is to be subjected to the simultaneous action of repeated stresses and corrosion, an electric resistance weld should be used for the maximum resistance. With proper heat treatment, they agreed, stainless steel always will offer more protection against the combined ac-

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tion of repeated stresses and corrosion.

In a paper entitled "Notes on the Fatigue Testing of Welds," J. H. Zimmerman, Massachusetts Institute of Technology, stated some valuable conclusions from a design standpoint. It is probable that in most fatigue failures, he said, that minute cracks originate at many points simultaneously and that these spread ultimately to combine with corresponding intensification. By reducing the number of base points for cracks, that is, by eliminating irregularities and sudden changes in cross section, the welder can improve the fatigue resistance of welded pieces. Of equal importance is the production of sound welds, free from porosity. The author said one of the best means of determining the actual quality of deposited or adjacent metal in a welded joint is a fatigue test employing small, carefully machined specimens.

A detailed paper on the resistance welding of duralumin was presented by N. F. Ward, University of California. Two papers scheduled for this session were not presented, in absence of the authors. One was "Effect of Peening on Physical Properties of Welds and Stress Relief," by O. M. Harrelson, Georgia School of Technology; the other "Some Tests of Thermit Welds," by Percy Hodge, Stevens Institute of Technology.

Wire Mill Operators Offer Ideas on Plant Practice

DISCUSSING bright annealing of wire in electric furnaces at a meeting of the Wire association in New York, Oct. 3, O. S. Haskell, industrial heating engineering department, General Electric Co., Schenectady, N. Y., described the bell and continous tube type units being adapted in the field of wire annealing. Low-carbon steels can be bright annealed successfully in furnace atmospheres in which the relations between hydrogen and water vapor, carbon monoxide and carbon dioxide are held in the proper ratios.

Inorganic materials such as lime and lubricants on the surface of wire result in the deposition of a smut during the annealing process, according to a member of the association. This must be removed before drawing the bright wire to smaller gage. Discussion developed the fact that the electric process of annealing would not remove this smut and that some method of cleaning would be necessary the same as in ordinary practice.

Lubricants Hold Key

One member emphasized that the matter of how closely bright surface finish is approached depends upon the nature of the lubricants employed. Some plants today merely aim to produce semibright finishes during the early stages and by so doing they report a reduction of 20 per cent in the cleaning room time and a reduction in labor and the loss of metal.

In discussing gaseous atmospheres used in the annealing, a furnace builder cited the use of methanol. While scale is not removed in an atmosphere of this type, the speaker stated, still the smut is not baked on. Instead it is in the form of amorphous carbon which serves as a lubricant in subsequent drawing operations and need not be removed.

A lecture on "Steel Wire Manufacture," illustrated by motion pictures, was presented by F. H. Nullmeyer, superintendent, rod, wire and conduit departments, Youngstown Sheet & Tube Co., Youngstown, O.

Applying Sull Coating

Sull coating is obtained at some plants by the use of small sprays that are allowed to play on the coils of wire. During the hot summer months, it requires longer time for the sull coat to form, according to opinion from the floor, than it does in the spring of the year. The operation, it was stated, must be supervised carefully. At one plant the practice is to wash the cleaned rods with water at 150 pounds pressure and then set them on the sulling rack. If time does not permit this procedure, the rods are dipped in a tank of acidulated water to hurry the formation of the sull coat. The speaker cautioned, however, that the water should not be too strongly acidulated, otherwise a black wire results.

Acidulated water is not adapted for sulling wire intended for welding, stated a producer. His practice is leave the coils on the racks for about two hours to promote the sull coating, spraying them with cold water. In the summer time, he stated, the rods must be left on the conveyor longer than in the winter in order to obtain the proper sulling effect. In his opinion the temperature and humidity have a large bearing on the sull that is obtained.

If some method could be developed for removing the burr on welded wire joints, stated a wiremaker in discussing the subject of joining wire coils, more producers of wire would adopt the practice. A maker of galvanized wire, in describing welding practice at his plant, mentioned that care is taken to remove all semblance of the burr, thus avoiding surface cracks after the galvanizing coating is applied. It was brought out that if the welded joint is annealed, the wire seldom breaks at the weld. To obtain a good weld, the aim of one galvanizer is to throw a heavy flash. To make a satisfactory weld and file off the burr requires approximately five minutes, according to the practice at a midwest plant.

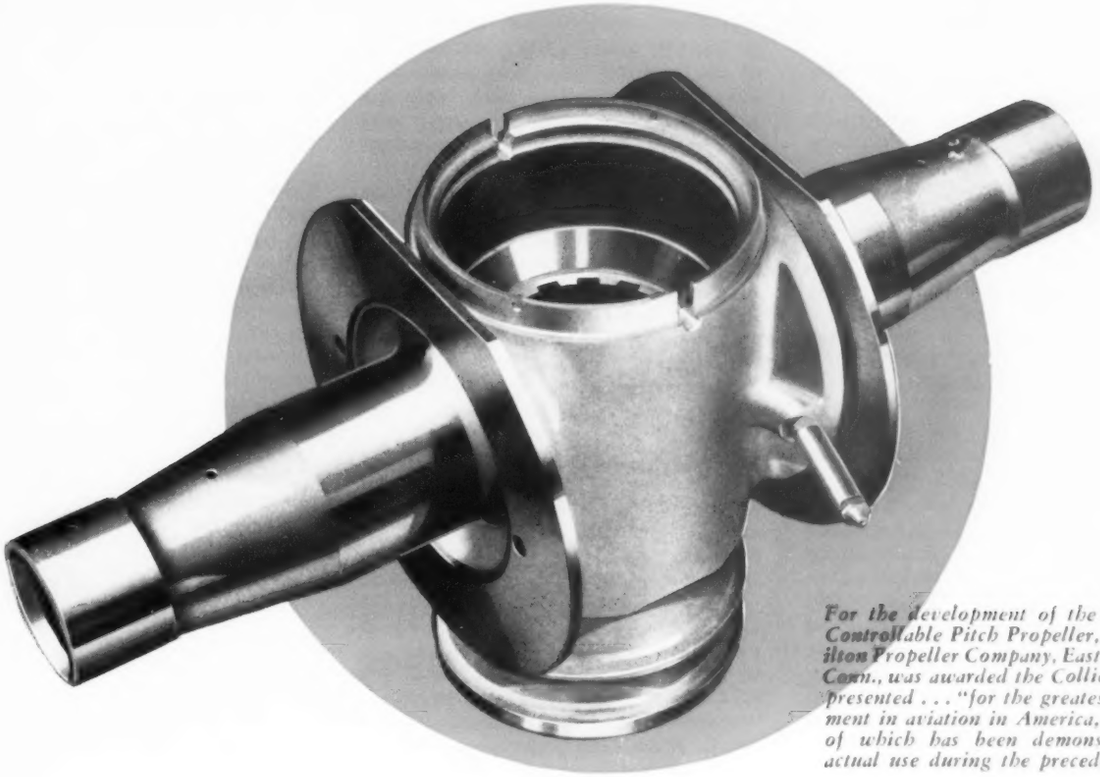
THOROUGHLY covering the subject of cold drawn, high-carbon steel spring wire, Edward J. P. Fisher, Keystone Steel & Wire Co., Peoria, Ill., submitted a paper which was awarded the Wire association medal, a bronze plaque, in recognition of the most meritorious and valuable contribution of its kind to the wire industry during the past year.

Starting with a discussion of the origins of quality spring wire in the open-hearth furnace, Mr. Fisher set forth the details of soaking pit practice, rod mill practice, cleaning of rods and patented stock, sull coating, lime coating, etc. He used photomicrographs to show why drastic reduction in cross section is a hazardous practice. He showed how patenting of rods increases ductility. He told how the heat resistance of tallow-base soap used in dry drawing may be increased by adding aluminum stearate to it. The paper, in effect, was a treatise briefly presenting an account of the latest practice in producing cold drawn steel spring wire.

Surveys Lime Substitutes

An interesting paper on substitutes for lime was read by Harold G. Hobbs, Cleveland. He pointed out that at one time or another various materials have been tried out and found successful; Such materials include flour, soda ash, starch and others. Mr. Hobbs believed that lime won out largely because of lower initial cost and consumption, and not because of superior applicability. He described recent experiments with silicate of soda and trisodium phosphate, concluding that the use of these materials is accompanied by certain advantages and disadvantages.

Discussion of Mr. Hobbs' paper revealed that comparatively little is known about the use of substitutes for the old-fashioned lime coat. It was thought that the chief obstacle in the way of substitutes is that investigators so far have sought to use these substitutes with the same equipment and the same technique used for lime coating, whereas the use of each sub-



For the development of the Hamilton Controllable Pitch Propeller, the Hamilton Propeller Company, East Hartford, Conn., was awarded the Collier Trophy, presented . . . "for the greatest achievement in aviation in America, the value of which has been demonstrated by actual use during the preceding year."

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stitute demands equipment and technique which must be developed especially for it. It further was concluded that the maximum saving that could be effected by the use of substitutes would not exceed a fraction of a cent per ton of wire rods, and that there was no likelihood that any manufacturer would want to expend effort and money on research work that would bring about such a small saving. On the other hand, it was admitted that the whole question would be viewed differently if it could be shown that the use of substitutes would bring other advantages, such as quality of finish.

The subject of inherent grain size was interjected in this session and it was shown that this subject is recognized generally in the wire industry as an important one. As one speaker put it, steel, no matter how altered by heat treatment, tends to return to, or be influenced by, its original grain size; hence, the factors involved in controlling the inherent grain size are receiving keen attention. Discussion of this subject in the Wire association meeting was terminated by reason of the fact that the American Society for Metals had scheduled a symposium on this subject.

Mention was made of the practice, entirely nonexistent in the United States, by which German mills manufacture furniture spring wire. Most of this is made from steel containing 0.06 to 0.08 per cent carbon, with the wire subjected to such drastic cold water quenching that it develops spring stiffness.

In reply to a question it was stated that consumption of sulphuric acid in the wire industry averages 40 to 50 pounds per ton of wire. This average was stated for 60 to 63 baume acid. In some cases the consumption has gone as low as 35 pounds per ton of wire, but this is most exceptional in good practice. One speaker pointed out that by raising the pressure and volume of water in an effort to suppress scale, the consumption of acid may be reduced, but the effect of such practice is to stiffen the rod to an extent which makes it unsatisfactory for many products.

A question from Australia on methods of eliminating acid fumes brought out the surprising extent to which this problem has been removed by the use of inhibitors. It was stated that the problem of fume elimination had practically vanished in American wire mills. It was felt that the exceedingly high cost of inhibitors delivered in Australia might have the result of keeping alive the problem of fume removal in that country.

Examines Causes of Heat Checking in Steels Used for Die Casting Dies

A DISCUSSION of steels for die casting dies, including observations in regard to heat checking, opened a joint meeting of the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers in New York Oct. 2. The speaker was Sam Tour, Lucius Pitkin Inc., New York. Heat checks, in his opinion, are due to strains set up by repeated changes in temperature, and these strains, at one time or another, set up stresses that exceed the elastic or fatigue limit of the material in question. The amount of strain is a function of the difference in temperatures between two adjacent parts of the same block of steel; in other words, the temperature gradient. Assuming that the modulus of elasticity of steel is approximately independent of composition, the following properties should be sought for in the effort to obtain a steel with maximum resistance to heat checking: Minimum coefficient of expansion, maximum thermal conductivity, maximum elastic limit, maximum endurance limit.

If it is considered that stresses are developed rapidly by sudden heating, Mr. Tour explained, it also must be borne in mind that the application of stress has somewhat the nature of an impact and therefore, a high impact value must be added to the list of the desirable qualities of a die steel. In most cases, the die during operation becomes hot. Therefore, all these properties must be considered from the standpoint of this temperature. In other words, the desired high elastic limit and the desired high impact strength, etc., should be at the elevated temperatures.

Summarizes Requirements

Practical requirements for a steel for dies for casting aluminum for instance, were listed by the speaker as follows: Machinability; stability in heat treatment; resistance to heat checking; resistance to deformation, battering, i.e., hardness; resistance to cleavage cracking on sudden heating or cooling, i. e., toughness; resistance to erosive and solvent action of molten aluminum; cleanliness and uniformity; cost—producibility, forgeability, etc.; properties at elevated temperatures.

In discussing stability in heat treatment, Mr. Tour declared that the standard chrome-vanadium steel used for many years for dies is not satisfactory because of its tendency to warp, grow, shrink, and crack during the heat treating process. The tungsten-chromium type of air hardening die steels all are satisfactory from the standpoint of stability in heat treatment. The tungsten-chromium type of oil hardening die steels are somewhat dangerous inasmuch as it is common practice in the manufacturing of die casting dies to have blocks cut up with heavy sections next to thin sections, with sharp corners between the two, and a steel that requires oil quenching is liable to crack at these weak points. In general, it seems that the air hardening type of steel, whether it contains tungsten or not, is preferable for general purposes.

Certain Hardness Essential

Apart from the relation of hardness to resistance to heat checking, there is required a certain amount of hardness in any block for service reasons. Dies are made up of moving parts, slides, cores, pins, and usually are hot when in operation. All die parts must be hard enough so that excessive rubbing and scoring and eventual seizing of the parts does not occur. It is possible, he asserted, to have soft main or stationary blocks in a die, and hardened moving pieces, but is is preferable to have all the main parts of the die made of the same steel and hardened. Moving parts can be left somewhat harder than the stationary parts.

Another paper which commanded considerable interest, covered properties of some brass die casting alloys. It was prepared jointly by O. B. Malin, assistant professor of metallurgy, Pennsylvania State college, State College, Pa., and W. W. Sieg, metallurgist, Titan Metal Mfg. Co., Bellefonte, Pa. In noting the effects of the addition of aluminum, Mr. Malin said the working of the metal seemingly was improved and its finish was undoubtedly so. Ultimate strength was increased by adding ½ per cent aluminum but no further rise was noted by increasing 1 per cent.

When iron and silicon were added, Rockwell hardness and yield point were visibly increased; reduction of area and elongation were decreased.

Sees New Era for Light Metals

IN THE future use of metal, it is practically certain that the engineering suitability of nonferrous metals will be in much greater proportion to iron than the present and

recent past ratio of the consumption of these metals," Dr. Zay Jeffries, consulting metallurgist, Aluminum Co. of America, Pittsburgh, said in a paper presented at the American Society of Mechanical Engineers session in the Port of Authority building, New York, Tuesday, Oct. 2. The meeting was one of the two lecture periods sponsored by the A.S.M.E. as part of the technical program of the National Metal exposition and National Metal congress.

Discussing "Nonferrous Metals, Today and Tomorrow," Dr. Jeffries painted an optimistic future for the principal metals of this group. He pointed out that the cost factor, which is often the dominating one in metal selection, will give iron preference over nonferrous metals in many applications where the latter enjoy better engineering suitability. However, he also predicted that in selecting metals in the future, engineering suitability will gradually be given a greater weight as compared with cost.

"Another factor in the use of metals in the next few decades can profoundly affect not only the total consumption of metals but also their relationships," Dr. Jeffries stated. "It is the industrialization of the Far East and backward countries. If the remainder of the world consumed as much metal per capita as western Europe and North America, the consumption would be multiplied by about five.

Japan Shows the Way

"We cannot hope to see such drastic change in our life time. A change in this direction, however, is in process as evidenced, for example, in Japan. From now on there will be pressure exerted on the more backward countries from two sides instead of one—a sort of closing-in movement with America and Japan pushing the movement westward and Europe pushing eastward. We can, therefore, hope to see a further substantial consumption of metal in the backward countries.

"Such a change in the early phases would not in itself be expected to change the relationships among metals materially. If and when the change becomes substantial, however, it should bring with it a great change in the nonferrous industry. The scarcer important metals, such as copper, lead, zinc, tin and nickel, should enter a veritable boom period. High prices should accompany large volume. At the same time, the need of making the more plentiful metals such as iron, aluminum, and magnesium even more adaptable to man's use, would offer a challenge to the ingenuity of research workers.

"But let us not assume that western Europe and North America have reached a peak either in metal consumption per capita or in population. The urge for a higher standard of living should be strong enough to insure an upward trend."

Dealing comprehensively with the uses, supplies, and relative values of the nonferrous metals in industry and the arts today, Dr. Jeffries admitted that the world nonferrous metal industry, with the exception of gold, is in an unsatisfactory state. But looking ahead a few years rather than a few months, the industry should receive much comfort in indicated trends, he concluded.

Dr. Jeffries was the sole speaker on the A. S. M. E. program. He was introduced by T. H. Wickenden, of the International Nickel Co. of Canada Ltd.

Alloy Steels for Fatigue Strength

INCREASING tendency toward the use of low-alloy steels for machine and structural parts, a more promising future for the adaptation of age hardening of steel, and a new era of alloy application now under way were trends considered significant by H. J. French, in charge of develoment work in iron and steel, development and research department, International Nickel Co. Inc., New York, who addressed 200 members of the Cleveland chapter of the American Society for Metals, Oct. 8.

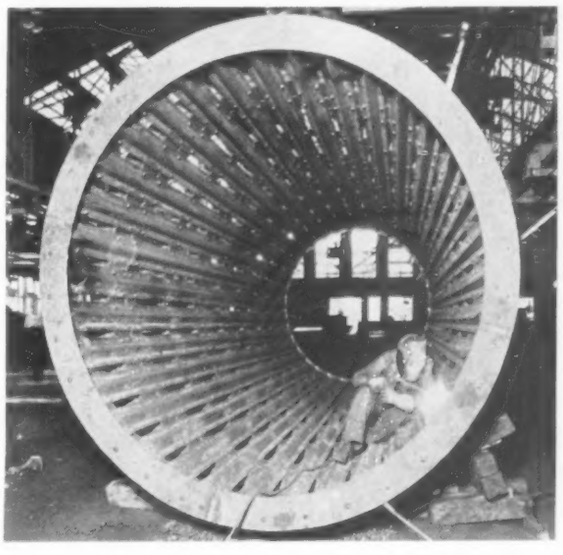
Mr. French's general subject was the hardening of steels and he presented an interesting insight into work currently in progress dealing with measurement of fatigue strength in steels. Fatigue strength or fatigue limit is represented by that stress to which a specimen can be submitted without failure for an infinite number of repeated cycles, and is a practical measurement of strength, since in service nearly all parts are subjected to some form of repeated stress, rather than a single load application.

Fatigue resistance can be built up in carbon steel by special heat treatment after the steel has been fabricated; but there are many machine parts, notably on steam locomotives, which are of such shape and weight as to make this treatment impractical. The problem of the metallurgist therefore is to develop types of steel embodying the necessary fatigue resistence without requiring hardening heat treatment after fabrication. In solving this problem the trend is toward the development of alloy steels, most of which show superior fatigue strength. Nickel is one important alloying element which improves fatigue properties of steel.

Carbon May Be Reduced

Coincident with adding alloying elements to steel to improve properties, advantage may be taken of the fact fatigue strength is improved with lowering of carbon content, the latter in some carbon steels being necessarily high to insure sufficient hardness. With alloying elements supplying the hardness, it now becomes possible to "adjust" the carbon content to take advantage of improved fatigue resistance.

Age hardening, hitherto confined commercially to certain nonferrous alloys, was seen as having future application in alloy steels. Practically all steels are capable of age hardening (increase of hardness of fatigue strength by long exposure at temperatures below the critical), some more than others. An example of this change is seen in the nitriding process where, following exposure at nitriding temperatures, fatigue resistance of the core of the nitrided part improves. Although there are no actual industrial applications of age hardening in connection with steels, Mr. French considered the possibilities bright.



BARKING DRUM HAS PLENTY OF BITE: This arc welded barking drum is 30 feet long, 9½ feet in diameter and is made up of a series of special rolled steel members or U-bars welded to the inside of ship channel rings. Wood logs are tumbled as the drum revolves at a speed of 7½-10 revolutions per minute. Built for the Nekooso Edwards Paper Co. by Fibre Making Processes Inc., it was welded by the Chicago Bridge & Iron Works, using welders supplied by the Lincoln Electric Co.

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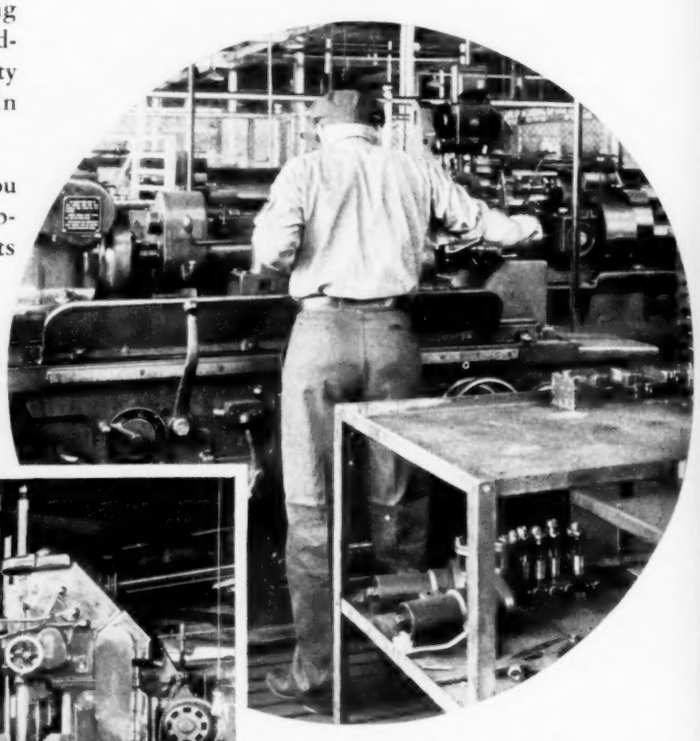

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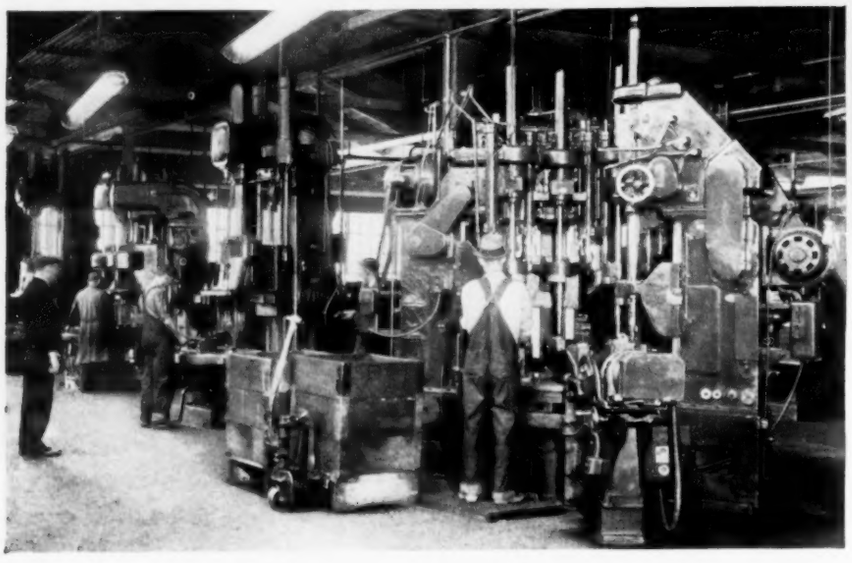

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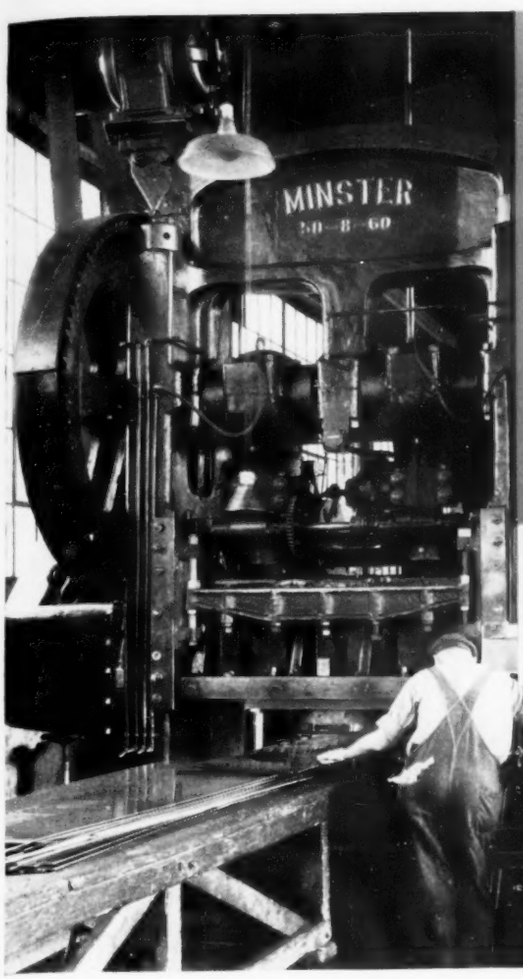

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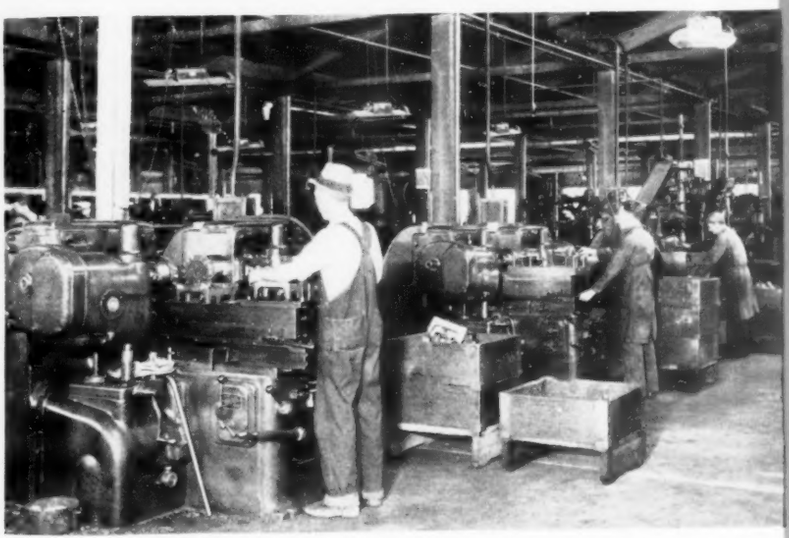

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The 1934 National Metal exposition was one of the most attractive of all metal shows. Much of the equipment displayed was used for demonstrations

More Highlights of Exhibits at the

SIXTEENTH NATIONAL METAL SHOW

FURNACES for a wide range of heating and heat treating operations comprised an important division of metal working equipment shown in the sixteenth annual National Metal exposition held in the Port of Authority building, New York, Oct. 1-5. Some 17 manufacturers were represented with various types of units utilizing gas, electricity or oil for fuel and a considerable portion of the equipment was in operation.

All of the gas-fired units were located in the gas section sponsored and supported by the American Gas association, New York. The Surface Combustion Corp., Toledo, O., exhibited in operation a special controlled-atmosphere high-speed steel hardening furnace; a pot hardening furnace using a high-pressure system; a unit heater; a direct gas-fired air heater with control unit; automatic proportioning and burner equipment of high and low-pressure and diffusion type; and an interesting display of metal parts gas carburized, bright annealed and hardened in units built by the company.

American Gas Furnace Co., Elizabeth, N. J., operated a new bell-type retort furnace for gas carburizing, nitriding, hardening, tempering, annealing, etc.; a full-muffle type, controlled atmosphere continuous heat treating furnace; a rotary retort gas carburizer; oven furnaces; pot furnaces; and a complete line of burners, blowpipes and air-gas control apparatus.

Although showing no furnaces or models, the Gas Machinery Co., Cleveland, supplied information on its line of forging and heat treating furnaces and equipment for gas plants. Parker-Kalon Corp., New York, exhibited an automatic gas-fired case hardening and tempering furnace equipped with a combination rack and basket which provide for the operations of loading, charging, quenching and discharging.

Numerous Other Gas Furnaces

The gas division of the American Electric Furnace Co., Boston, operated two gas-fired heat treating furnaces. A gas-fired tempering oven for air drawing tools, dies and miscellaneous products was shown by Lydon Bros., Jersey City, N. J. Photos of installations also were displayed. Included in the equipment exhibited by the Monarch Engineering & Mfg. Co., Baltimore, were a semimuffle gas furnace, a combination gas toolroom furnace, stationary and tilting-type crucible melting furnaces, and photographs of installations.

The exhibit of the General Electric Co., Schenectady, N. Y., comprised an illuminated series of transparents of electric furnace installations and an assortment of products heat treated by electric heat. The Ajax Electric Co. Inc., Philadelphia, and the Ajax Electrothermic Corp., Trenton, N. J., occupied their space jointly. The former showed photographs and drawings of electric heat treating furnaces for various applications; and a bricked-up section of a furnace with suspended flat roof construction. The roof supported a new type of helical heating element suitable for temperatures up to 2000 degrees Fahr. in an oxidizing atmosphere. Ajax Electrothermic Corp. demonstrated a small high-frequency electric heating furnace for automatic heating of steel slugs.

Hevi Duty Electric Co., Milwaukee, confined its exhibit to photographic displays and complete data on electric heat treating furnaces which it manufactures. Equipment for a heat treating process which it has developed to provide a deep case in a relatively short period was shown by the Chapman Valve Mfg. Co., Indian Orchard, Mass. This equipment consisted of salt bath furnaces and activator units which cause ammonia to break up into nitrogen and hydrogen, the nitrogen penetrating the steel under treatment and the hydrogen burning at the bath surface.

Several models of its hump-type and gaseous atmosphere electric hardening furnaces were exhibited in the booth of Leeds & Northrup Co., Philadelphia. Bellis Heat Treating Co., Branford, Conn., operated and demonstrated a 15-kilovolt-ampere salt bath heat treating furnace in which the bath is melted and kept at temperature by three electrodes.

Two electric furnaces for harden-

ing high-speed, carbon, high-carbon, high-chrome and alloy tool steels, were operated by C. I. Hayes Inc., Providence, R. I. Both featured atmosphere control.

WELDING and metal cutting occupied an important place in the metal exposition as indicated by the numerous displays. At the booth of the Air Reduction Sales Co., New York, there was in operation two models of the oxygraph. The performance of these machines attracted hundreds of visitors. Particular interest was centered on the new tractograph, a portable, motor-propelled, hand-guided oxyacetylene cutting machine for cutting steel plates and slabs in simple or intricate shapes over extended areas.

Interesting developments in the fields of oxyacetylene welding and cutting, hardfacing, ferroalloys and alloys steels were displayed and demonstrated by three units of the Union Carbide & Carbon Corp., New York. Linde Air Products Co. introduced its new machine used for straight line and circle cutting as well as for simple forms of heat treating and flame machining.

Haynes Stellite Co., Kokomo, Ind., presented three live exhibits including the famous "red-hardness" demonstration. In this test a Haynes stellite J-Metal cutting tool performs machining operations while held at a red heat by an oxyacetylene flame. Welding blowpipes shown included one with an electric ignition device, enabling the blowpipe to light itself automatically when the tip is touched to the work.

Shows Automatic Welders

Practically every use of electric arc welding and numerous new developments were demonstrated at the Lincoln Electric Co., Cleveland, exhibit. Two automatic welders were shown, one of the tractor type and one suitable for general industrial use. Two new electrodes were demonstrated, one type employed for producing welds of 85,000 to 100,000 pounds per square inch tensile strength on all low carbon steels under 0.30 carbon.

The Harnischfeger Corp., Milwaukee, exhibited its 300-ampere welder with the new automatic starter mounting. Other features pointed out to visitors were the magnetic bridge and unique winding which have eliminated the external exciter and at the same time extended the welding range. A 100-ampere welder, torches, hoists and electric motors completed the presentation.

A line of welding wire and electrodes for gas and electric processes was on exhibit at the booth of the Page Steel & Wire division, American Chain Co., Monessen, Pa. The company's high tensile electrodes were a feature of the showing. Westinghouse was at the show with its latest equipment in arc welding development. Apparatus included a motor-operated spot welder with Ignitron weld timer, a 500-ampere alternating-current welder in operation, and a 300-ampere engine-driven welder.

General Electric Co., Schenectady, N. Y., had an attractive layout of welding electrodes and visitors were particularly interested in the new portable arc welding set on display.

Welding Head Featured

The simple design, sturdy construction and easy operation of its arc welders was brought to attention by Una Welding & Bonding Co., Cleveland. Important features of the automatic arc welding head which the company also builds also were emphasized. Demonstration of welding rods and examples of cast iron, copper, brass and bronze welded with its rods made up the exhibit of American Brass Co., Waterbury, Conn. Electric welding equipment was shown by Wilson Welder & Metals Co. Inc., North Bergen, N. J.

Various types of welded specimens and the performance of its heavy mineral coated electrodes were presented by Metal & Thermit Corp., New York. At the Hobart Bros. Co., Troy, O., booth the construction of its simplified arc welders was shown by means of a disassembled unit. The self-starting feature and remote control of current of its gasoline engine and motor-driven machines were demonstrated. Eisler Engineering Co. Inc., Newark, N. J., had a display of electric spot welders along with other equipment it builds. Hollup Corp., Chicago, featured a welding operation and an exhibit of welded specimens.

Protected arc welders were to be seen at the U S L Battery Corp., Niagara Falls, N. Y., booth. A production welding operation and a full assortment of welding and cutting equipment made up the exhibit of Bastian-Blessing Co., Chicago.

Equipment for spraying metals by the oxyacetylene torch was demonstrated in the booth of the Metallizing Engineering Co. Inc., New York, eastern representative of the Metallizing Co. of America, Los Angeles. The exhibit included a display of spray guns, control apparatus, metal spray wire, and numerous examples of coated work.

VARIOUS types of cutting tools, drawing and extrusion dies attracted attention at the booth of Carboloy Co. Inc., Detroit. An interesting display of various parts machined with tools produced by this company, and applications of hardened inserts enhanced the exhibit. Cutting of high speed and machinery steels with its molybdenum steel hacksaw blades was in progress at the headquarters of Victor Saw Works Inc., Middletown, N. Y.

Wire drawn at the rate of a mile a minute drew a crowd to watch the operation of the machine demonstrated by Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Spencer Turbine Co., Hartford, Conn., furnished air for the gas section of the exposition with one of its multi-stage turbocompressors. Other units built by the company also were in operation. At the booth of the Morse Twist Drill & Machine Co., New Bedford, Mass., drills, reamers, taps, dies and milling cutters for use on various types of materials comprised the display. Henry Pels & Co. Inc., New York, demonstrated punches and shears. Visitors watched the drawing of copper and high carbon steel wire at the headquarters of Maschinenfabrik Herborn, New York.

Braiding machines for wire insulation were shown by Textile Machine Works, Reading, Pa. The units covered No. 14 wire at the rate of 11 feet per minute. Cutting tools, die sawing and filing machines, measuring gages and the like, made up the exhibit presented by Marburg Bros. Inc., New York. Several machines including a profile projector were shown by Triplex Machine Tool Corp., New York.

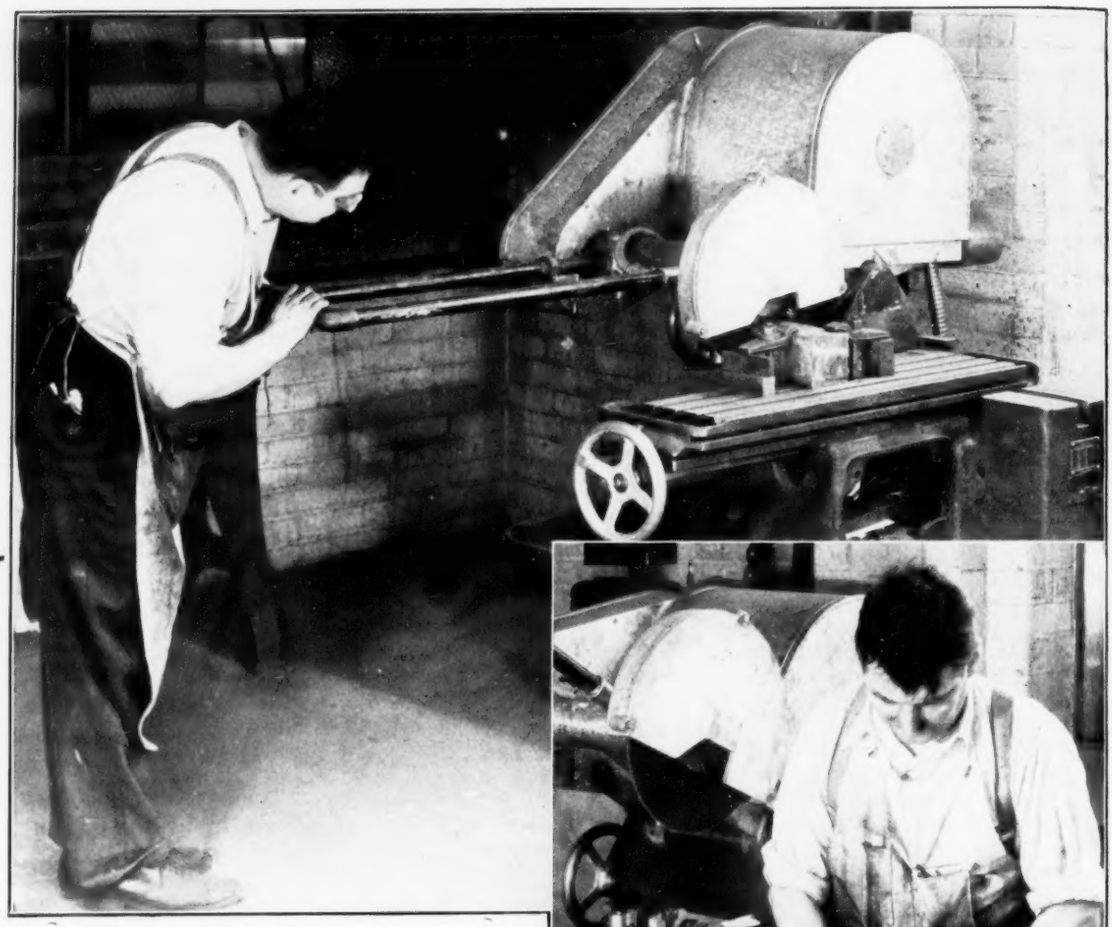
USES of dowmetal in various types of products including portable tools such as electric hammers and saws was brought to the attention of visitors at the exhibit of the Dow Chemical Co., Midland, Mich. The extreme lightness which characterizes this material also was exemplified by a prospector's core drill in which its use reduced the weight of the drill 150 pounds.

Various applications of aluminum bronze die castings were displayed by Aurora Metal Co., Aurora, Ill. These included parts for printing presses, outboard motors, variable speed mechanisms, gear and worm blanks, electric hand saws and sanders, spray, guns, etc. Die cast silicon bronze enclosed type centrifugal pump impellers also were shown. Actual production of various types of die castings was carried on at the Madison-Kipp Corp., Madison, Wis., booth.

The extensive possibilities of cadmium plating of metal parts were impressively shown by the Udylite Co., Detroit. The electrolytic process of applying cadmium for rust prevention was demonstrated, the new cadmium ball anode with helical coil container being employed to show that there is no loss of metal. A wide variety of products now being plated with this process provided a background for the exhibit.

Zinc die castings of all types and sizes featured the showing present-

MACKLIN
CUT-OFF
WHEELS



MACKLIN GRINDING WHEELS

The non-ferrous casting being ground has a brinell hardness of 200-250. Made by City Pattern Works, Detroit.

Macklin Grinding Wheels are highly proficient in cutting off heavy gates of aluminum bronze castings . . . aluminum castings . . . red brass castings . . . high conductivity copper. On this page is shown a Macklin Wheel making a fast, clean cut of a bar of aluminum bronze five and one half inches square. An operator is shown holding the clean cut bar. This material is very hard to cut but Macklin cut off wheels cut right through it.

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS

Jackson, Michigan, U. S. A.

Sales Offices:—Chicago—New York—Detroit—Pittsburgh—Cleveland—Milwaukee

ed by New Jersey Zinc Sales Co., New York. Particularly interesting to visitors were the intricate and broad range of designs that now can be produced as zinc die castings. A vast number of machinery and product fields utilizes die castings in one way or another.

PORTABLE apparatus for testing structural, mechanical and chemical variations of ferrous metals was demonstrated by the Magnetic Analysis Corp., Long Island City, N. Y.

A new method of X-raying welded seams up to 4 inches in thickness was demonstrated by the General Electric X-Ray Corp., Chicago. Bausch & Lomb Optical Co., Rochester, N. Y., displayed for the first time a small littrow-spectrograph, a new microscope for measuring thickness of chromium plating, and also a new opaque illuminator.

Demonstrating a new supersensitive type of balancing machine which will detect 0.0005-inch-ounce, the Tinius Olsen Testing Machine Co., Philadelphia, displayed a full line of testing equipment, which also included a new spring testing machine for classification as to strength and uniformity, and a new stiffness machine for testing uniformity of temper of small parts.

Magnaflux Corp., New York, demonstrated a nondestructive method of inspecting steel parts for the detection of cracks, seams, laps, etc.; also a new type of spring produced by John Chatillon & Sons, New York, and galvanometers, produced by the Rubicon Co., Philadelphia. Radium Preparations Inc., New York, displayed radiographs taken with radium.

Exhibits Hardness Testers

A new bench-type hardness testing machine was featured by the Gogan Machine Corp., Cleveland, along with a heavier floor model. Kelley-Koett Mfg. Co. Inc., Covington, Ky., exhibited a diminutive model of a weatherproof and shockproof X-ray machine, capable of penetrating up to 6 inches of steel.

Metallurgical microscopes, optical instruments and metallurgical grinding and polishing machines were exhibited by E. Leitz Inc., New York. Carl Zeiss Inc., New York, exhibited for the first time equipment for photographing metal specimens under high and low power and in varying degrees of light. Various other instruments were displayed.

Torsion impact and static torsion machines were demonstrated by the Baldwin-Southwark Corp., Philadelphia, as a feature of this exhibit of testing equipment. Samples of extruded wrought pipe produced by presses, which the company now is building, also were shown.

Magnetic inspection equipment, of the production type, was exhibited by the Ferrous Magnetic Corp., New York; also a magnetic strip and wire analyzer and magnetic furnace control, all under active demonstration. Of special interest was the equipment for quickly determining, by a thermomagnetic method, the abnormality of steel.

Wilson Mechanical Instrument Co., New York, demonstrated a new stiffness tester. The device is designed to test steel up to 1/16-inch, steel too thin for a penetration hardness test. Other hardness testing equipment was displayed. Shore Instrument & Mfg. Co., Jamaica N. Y., featured a new internal tester for tubes as small as 6 inches in inside diameter, among other harding devices.

An abrasion tester was featured among a number of Schopper testing machines exhibited by Testing Machines Inc., New York; also a new bending and stiffness tester. The George Scherr Co., New York, displayed precision measuring and testing devices.

VITRIFIED grinding wheels of controlled structure, for grinding and lapping cemented carbide tools, were a feature of an attractive display by the Norton Co., Worcester, Mass. These wheels, known as the Norton Bortz wheels, covered a wide range of sizes and shapes. Boron carbide products also were on display as well as bakelite and rubber bonded snagging wheels, abrasive paper and cloths, and miscellaneous sharpening stones and rubbing bricks.

A new diamond wheel for the grinding of hard cemented carbides was exhibited by the Carborundum Co., Niagara Falls, N. Y. The company's exhibit also included an attractive display of general grinding wheels, polishing grains, abrasive paper and cloth and lapping compounds; also samples of finished ground rolls and some notable examples of ultra-finish grinding of pins, rolls, etc. Of special interest was a model of a recuperator which utilizes waste heat for preheating air.

A wide variety of vitrified and bakelite wheels, ranging up to 36 inches in diameter, was exhibited by the Macklin Co., Jackson, Mich. A cutting-off machine for bar stock up to 2 inches in thickness was also shown, in operation.

Manhattan Rubber Mfg. division, Raybestos-Manhattan Inc., Passaic, N. J., exhibited a machine using a cut-off wheel, operated in conjunction with a flow of water. Samples were shown of chrome-nickel castings which had been ground by rubber bonded wheels.

Properties of an insulating firebrick designed to effect substantial savings in industrial furnace operating costs were demonstrated by Babcock & Wilcox Co., New York. Two gas-fired industrial furnaces were in operation, for the purposes of the demonstration. One new firebrick shown had a maximum use limit of 3000 degrees Fahr. and another, lower in price, operates at temperatures under 2600 degrees Fahr.

High-temperature firebrick cement and refractories were displayed by the Botfield Refractories Co., Philadelphia, the refractories including plastic firebrick and chrome hearth material.

Centrifugally cast steel pipe, heat and corrosion-resisting, ranging from 4 to 16 inches in diameter, was exhibited by the Michigan Steel Casting Co., Detroit; also alloy steel pipe fittings, including three new types of joints.

Shows Nitrided Cylinder Sleeves

Centrifugally cast nitrided iron, for bushings and internal combustion engine sleeves, designed to withstand temperatures ranging up to 500 degrees, was exhibited by the Forging & Casting Corp., Ferndale, Mich., which also displayed air hardening and oil hardening tool steel cast to shape for forming, drawing and blanking dies, cams and other parts.

Featuring differentially hardened castings, which in some cases had three brinell ranges in one casting, the Sivyer Steel Casting Co., Milwaukee, exhibited a wide range of corrosion and heat resistant castings. The display included refinery fittings in special alloy steels. Eastern Steel Castings, Newark, N. J., showed a line of automobile and railroad castings, featuring a cast steel wheel for motor trucks.

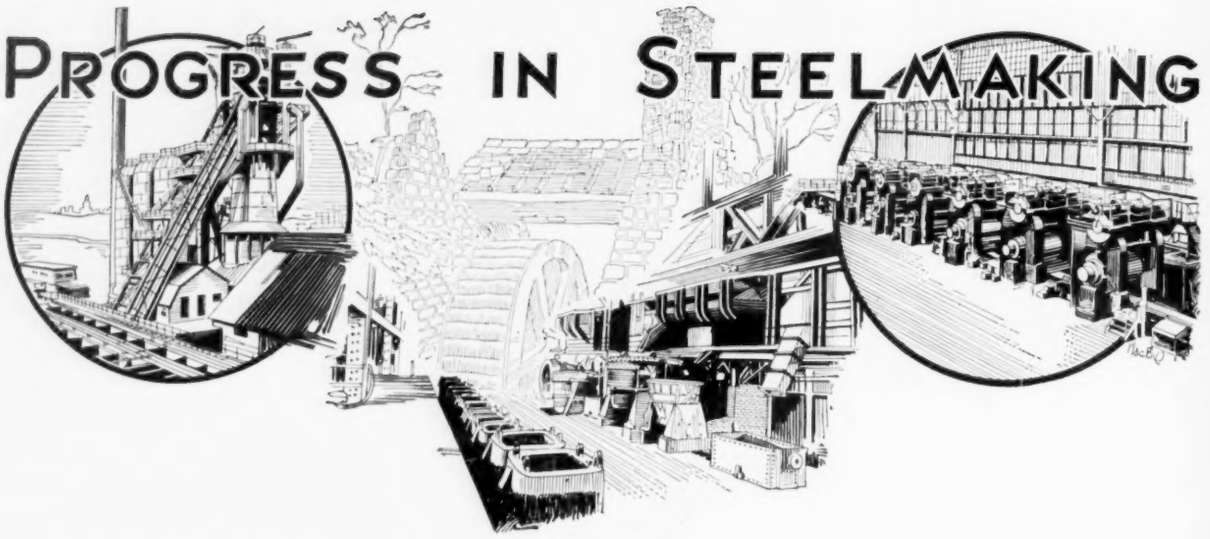
A large variety of alloy castings was displayed by the General Alloys Co., Boston, Mass., including centrifugal filters for the process industries and shaft tunnel rings and portholes for navy boats. An interesting feature was a large number of used carburizing boxes, which had exceeded by 50 to 400 per cent the wearing guarantees.

Dardelet Threadlock Corp., New York, displayed a threaded, ball bearing locknut, designed to replace the standard threaded locknut and lockwasher used in conjunction with a slotted shaft for ball bearing assembly; also shown was a patented rivet-bolt for use in steel construction.

To demonstrate the effectiveness of its belt preservative, the Cling-Surface Co., Buffalo, had in operation a machine with two separate drives, one equipped with a belt treated with its preservative and the other with a belt treated with neatsfoot oil.

Oils for use in machining and drawing of stainless and other alloy steels were a feature of an exhibit by D. A. Stuart & Co., Chicago.

PROGRESS IN STEELMAKING



PROMISING properties are claimed for bearing metals which have lead as a base and are not hardened with tin and antimony but with alkali-alkaline earth metals, such as sodium, calcium and barium. The use of this type bearing metal in this country is increasing.

♦ ♦ ♦

Successful application of tar to the surface of ingot molds is attributed largely to the temperature of the coating, according to the practice at an eastern open-hearth plant. If the tar is too cold, longitudinal cracks in the ingot will develop. Consequently the temperature of the tar is tested with a thermocouple and pyrometer after every fourth mold is dipped.

♦ ♦ ♦

Automatic operation features a baling press installed at an Eastern plant for compressing tin plate scrap. When ready to bale, the operator trips an air-operated lever and all other motions are performed automatically up to the point of charging for the next cycle. Meanwhile,

the operator is free to prepare for the next charge. Bales 16 x 16 inches in cross section, 15 to 16 inches long, weighing about 400 pounds and with a density ranging from 36 to 38 per cent are produced. Approximately 28 tons of scrap is baled per hour on a cycle of 22 seconds. Only one operator is required at the press although a second man is necessary for shifting railroad cars and other duties. However, only 0.08 man-hour per gross tons of scrap baled is involved, including the time of both men.

♦ ♦ ♦

A stainless steel producer after searching vainly for a pickling tank which would withstand the Krupp formula solution (200 parts hydrochloric acid, 50 nitric acid, 50 sulphuric acid and 700 parts water by volume) finally developed a tank which is giving satisfactory results. Ordinary tank plate steel was used for the shell. The base and walls of the tank were coated with a 1-inch layer of asphalt composition and on this was installed a lining of acid-resisting brick layed up with acid-resisting cement. While the brick is impervious to the pickling solution, it cracks under expansion. The asphalt lining, however, automatically caulks any openings.

♦ ♦ ♦

Hollow drill steel is being manufactured in Sweden by a simple process. Instead of filling the drilled hole in the billet with sand before rolling, as is customary, a rod of austenitic steel is inserted in the opening. When the work passes through the mill, the rod is reduced in the same proportion as the billet. The rod, which maintains the concentricity of the hole more uniformly than does sand, is withdrawn easily after reduction is completed.

♦ ♦ ♦

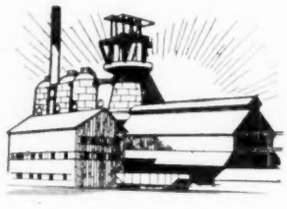
To eliminate interrupted pouring schedules at pig machines is the purpose of a newly developed traction wheel for the mold strands. Openings are provided in the wheel 90 degrees apart for the purpose of disposing of any spilled metal or iron shot. By this arrangement metal cannot solidify in the bearing and, hence, wear is reduced to a minimum. Nor can foreign materials accumulate on the interior of the wheel to cause abrasion to the wheel or axle pin and thus result in breakage.

♦ ♦ ♦

By the addition of the elements silicon and copper to ordinary nickel-chromium-austenitic stainless steels, a Swedish metallurgist has found that the corrosion resistance is increased to an extremely high degree, and that the resistance to wear is enhanced. The steel proposed has a slightly higher percentage of carbon than the ordinary stainless malleable steels and nickel 25 per cent, silicon 5 chromium 3 and copper 1.5 per cent.

♦ ♦ ♦

Iron silicate in sinter increases sharply from 6 to 10 per cent of silica, and above this range a sufficient quantity likely is to be present to appreciably retard reduction



in the blast furnace, according to the bureau of mines. If silica exceeds 10 per cent, significant amounts of iron will exist as ferrous silicate. This mineral, which is slowly reduced, forms a protective coating around grains of magnetite and in all probability reaches the hearth unreduced.

STEEL, DEOXIDIZED WITH CALCIUM-SILICON

is

CLEANER STEEL

Calcium-Silicon when used as a final deoxidizer leaves steel more free from inclusions. Both elements of this alloy are active deoxidizers. Their effect is rapid and positive. The slag that is formed has low specific gravity and rapidly frees itself from the molten steel. The result is a cleaner, free-flowing steel.

Information on the correct use of Calcium-Silicon in the manufacture of steel is readily available from Electromet.

CHROMIUM
High Carbon Ferrochrome (maximum 6% carbon)
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

SILICON
Ferrosilicon 15% Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 85%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% Silicon)
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon
Silicon-Copper
Miscellaneous Silicon Alloys

BRIQUETS
(Patented)
Chrome Briquets Silicon Briquets
Manganese Briquets

TUNGSTEN

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

SILICO-MANGANESE
All grades including Silico-Spiegel

VANADIUM
All Grades

ZIRCONIUM
Aluminum-Zirconium
35 to 40% Zirconium
12 to 15% Zirconium
Zirconium-Manganese-Silicon

Electromet
Ferro-Alloys & Metals

ELECTRO METALLURGICAL SALES CORP.
Unit of Union Carbide and Carbon Corporation
UCC
CARBIDE and CARBON BUILDING,
30 EAST 42nd STREET, NEW YORK, N. Y.

NRA CODE

Rolls Large Diameter Tubes On New Type Radial Mill

SEAMLESS thick-walled tubes and hollow bodies now are being manufactured in Germany in lengths up to about 33 feet. Tubes in this length heretofore could be made only by forging and turning the pieces, according to *Demag News*. Any material, capable of being rolled, can be treated. Although it is possible to make thick-walled tubes by forging, the tubes, in regard to accuracy of gage and condition of the surface, are finished off in the hot state, whereas after the long and tedious forging process the rough tubes have to be turned which entails the loss of a large part of the forged material. This waste can be as much as 50 per cent and even 70 per cent of the weight of the initial material.

The inventor of the new rolling mill is M. Roeckner, Deutsche Rohrenwerks A. G. in Mulheim-Ruhr, designed and built a rolling mill of this kind. This mill was originally intended as a test mill, but, over and above the tests, it was soon possible to start production and make and supply hollow bodies with diameters up to 48 inches, 28 feet long and piece weights of up to nearly 20 tons, and this new type of mill is still possible of further development.

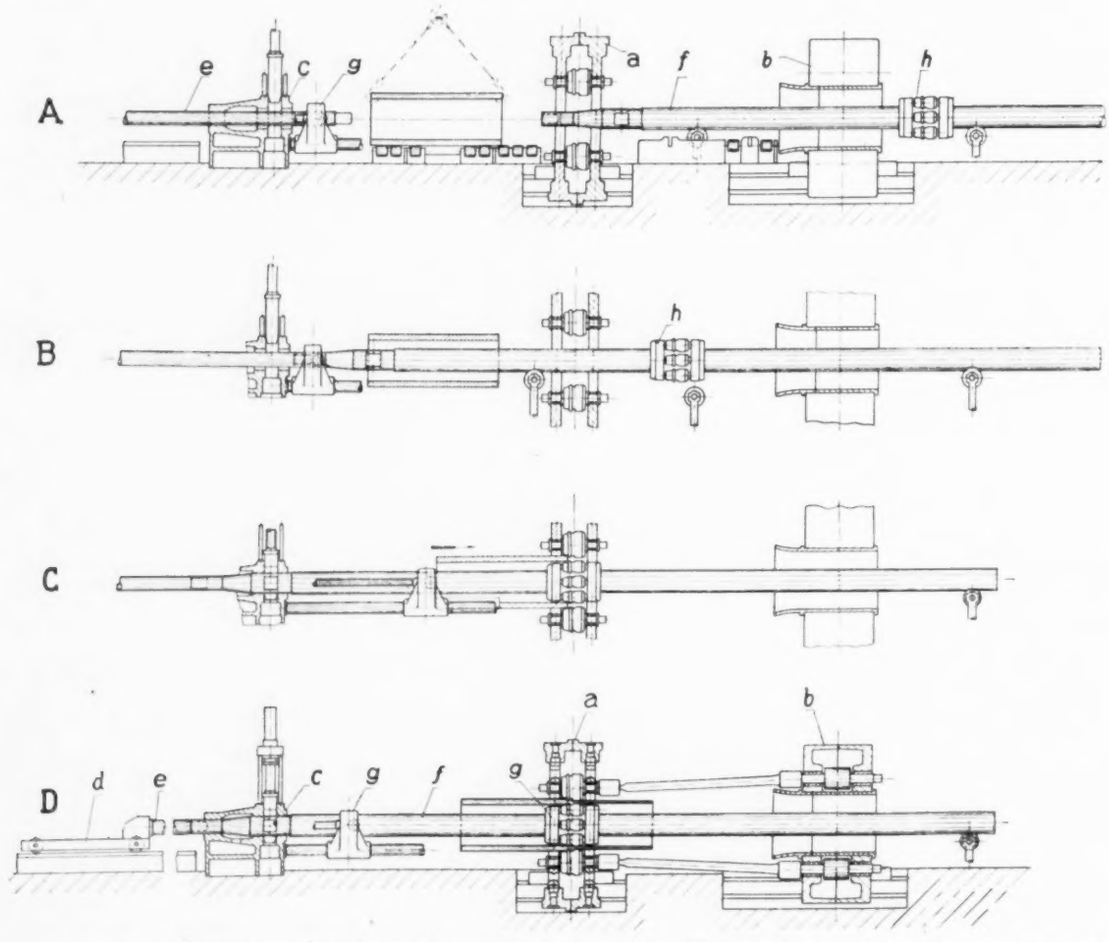
Larger Mill Being Designed

Demag is working at the moment on plans for a new and still heavier construction to roll hollow bodies up to 71-inch diameter and 39½ feet in length. The manufacture in this way of hollow bodies up to 100 tons finished weight has even been considered.

The rolling mill consists of several pairs of rolls arranged radially to one another. The outer rolls are mounted in a ring-shaped stand and driven through a pinion housing, while the inner rolls are carried by a mandrel head in the interior of the hollow body. The axes of the pairs of rolls, provided with different grooves, lie somewhat inclined to the axis of the steel bloom, so that the roll-traces on the bloom form inside and outside helical lines and the bloom is drawn through the mill automatically by the rolls. The first pair of rolls produces a corrugation inside and outside that runs round the bloom in a helical line. The second and following pairs widen this corrugation still more until the swelling towards the end of the bloom is straightened out flat.

The accompanying lay-out shows how the sleeve bloom is inserted in the mill and how it passes through the ring-like arranged grooves to emerge finally from the mill as a finished rolled boiler drum or such like.

The mill recently rolled a copper nickel alloy steel tube which measured before the smoothing pass 26½ feet long. The wall thickness was 2¾ inches and the inside diameter 35½ inches. The product coming off a mill of this type is used for steam turbine tubes, boiler drums, cracking vessels and other applications where high pressures are employed.



A) The coupling rod and the shank rod are drawn back, so that the cast or forged sleeve bloom can be inserted in the rolling mill

B) The shank rod with the mandrel head carrying the inner rolls is advanced.

C) The shank rod is anchored in the abutment bearing; the inserter pushes the sleeve bloom into the stand.

D) The sleeve bloom is rolled out; the inserter is drawn back again.

Arrangement and working method of radial mill for rolling thick-walled seamless tubes

a, roll stand; b, pinion housing; c, abutment bearing; d, shifting carriage for coupling rod (e) and shank rod (f); g, inserter; h, mandrel head with inner rolls

Material Savings Effected By Slag Control Methods

TO CONTROL the slag in the blast furnace is to control the character of the pig iron made, stated Ralph Sweetser, consulting engineer, New York, in opening the symposium on slag control before the iron and steel division, the American Institute of Mining and Metallurgical Engineers at Hotel Pennsylvania, New York, Oct. 4. Reports of previous sessions were presented in the Oct. 8 issue of STEEL.

Slag characteristics, he stated, depend on the fuel used and analysis of ore and flux. Slag under charcoal practice offered no problems, he pointed out, but in 1820 when block coal began to be used, slag troubles developed. The speaker related how a Philadelphia concern spent half a million dollars to use coke at a stack in the Johnstown, Pa., district without success because the coke was made from the wrong kind of coal. Later it was only by the trial method that the correct kind of ore, fuel and flux was found.

Tremendous slag volumes of the early anthracite stacks caused considerable difficulty. Raw coal was used successfully in certain parts of this country but mostly in the Hocking, Mahoning and Hanging Rock areas in Ohio and in Mercer, Pa. This gave superior quality irons but the stacks were slow working. When beehive coke was introduced chemical knowledge was available and difficulties, therefore, were not as great as in former practices.

Iron Ores Now Sintered

Recently the campaign for clean coal resulted in variations of the grade of coal used at power plants and for locomotive service. In the Lake Superior iron ore region work now is under way to reduce waste by sintering. This is in the interest of low cost pig iron and serves to reduce the volume of iron bearing materials hauled on railroads. It is metallurgically sound to have the slag volume low and to eliminate waste material outside of the furnace but, Mr. Sweetser warned, it is not advisable to remove all impurities.

Certainly it is not economical to have blast furnace slag with free running temperature so as to require hot fuel to melt it. Flux stone must be sized and washed if good practice is to result. At one time barium was considered satisfactory for a flux but, pound for pound, calcium oxide is much better.

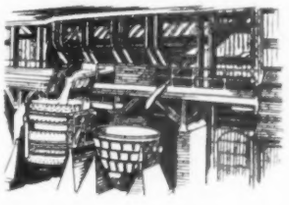
In discussing "The Slag Control for Rimming Steel," L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O., pointed out that everything that had to do with the open hearth affects rimming steel quality. All kinds of fuels have been used successfully in the manufacture of this grade steel, he stated, and each has its own peculiarity. Rimming steel heats are being made successfully from 20 to 150 tons with bath depths ranging from 18-20 inches to 36-40 inches. Excess silicon is the bane of quality controlled steels. Great care is taken to obtain physical hot iron in order to avoid the difficulty of laminations in the finished steel.

How Heats Are Worked

The importance of bottom makeup was stressed. Burned refractories are used for the open-hearth bottom. In charging heats a satisfactory method is to charge the limestone and part of the pig iron and one-half of the scrap. Later the remainder of the scrap is put in the furnace. The most efficient practice is to get the heat under cover as soon as possible and it is not detrimental to melt the heats rapidly. If the heat melts dead, cold pig iron usually is added at this point. If the limestone comes to the surface then iron ore should be added.

Too much fluorspar causes watery slag and usually is found to be detrimental later on in the melt. Steelmakers aim to have a balance between low cost, increased tons per hour and the quality of material produced. Good results usually are obtained by the use of about 10 per cent limestone in the makeup. The aim of the furnace crew is to get the bath in shape so that the ladle metal will rim properly in the molds. If the iron oxide in the slag is too low it is easy to increase the content of slag by adding fine ores.

Low-carbon heats are proportioned so that they do not melt too hot. Iron oxide in the bath closely follows the iron oxide in the slag and it therefore is not difficult to determine the amount of deoxidizers to be used in the ladle. Manganese additions depend upon local conditions; some open-hearth melters use it in the furnace while others add it to the ladle. Heats tapped above 3000 degrees Fahr. usually pour higher than 2925; these are considered hot heats and may have risers.



Slag control returns a material savings to the steel manufacturer, declared W. J. Reagan, open-hearth department, Edgewater Steel Co., Oakmont, Pa. The silicon is kept from 0.60 to 0.65 per cent. With the lime charge of 7 per cent, the heats usually melt sufficiently high in carbon. Iron oxide in the finishing slag depends on the phosphorus content. Iron oxide in the slag at the time the furnace is tapped ranges from 6 to 7 per cent. The aim is to have the heats melt low in iron oxide and to bring them up to the desired percentage later. Low iron oxide in the slag means attractive savings in the cost of production. The flame has no effect on the slag as long as it is of an oxidizing character. The control of silicon and the percentage of lime in the charge will control the content of iron oxide in the slag.

Relative to slag control for recarburized rail steel, A. P. Miller and T. S. Washburn, Inland Steel Co., Indiana Harbor, Pa., mentioned that the steelmaking factors must be controlled. The slag composition is held within a range to give the quality of finished rails. The authors contended that the iron oxide in the slag should be maintained at a low level in order to obtain a good ingot yield. When the iron oxide in the slag is 9 per cent the average yield of 42 heats was 92.1 per cent, whereas when the iron oxide in the slag was 15 per cent the average yield was only 91.3 per cent based upon 30 heats. One company aims to keep its rail steel slags ranging from 10 to 15 per cent in iron oxide.

Involves Different Slags

Basic electric furnace slag involves two types of slag, namely for melting down and for finishing off, according to F. L. Walther, Timken Steel & Tube Co., Canton, O. The volume of slag to finish a heat of electric furnace steel depends upon the area of the bath. The type of slag depends on the size of the furnace, the type of steel, the temperature, and the analytical control. Finishing slags usually are in perfect condition about 45 minutes after slagging off, according to present practice.

The industry is not yet ready for large tonnage electric furnaces, Mr. Walther stated, inasmuch as the 18-inch electrode is the largest that can be made satisfactorily at the present time. Furnaces of 200-ton capacity probably would have to be operated in conjunction with a preheater in order to keep the bottoms hot. As the size of furnaces increase, the difficulty with bottoms increases in proportion.

Maybe your motors aren't buried in as much abrasive dust and dirt as is this one—but this photograph demonstrates the stamina of F-M motors against adverse conditions.

A history making MOTOR IDEA!

"A motor is a *mechanical* device having electrical functions." Years ago, this pioneer electrical manufacturing organization studied intensively the causes of motor failure, shortened service life and high maintenance.

Almost invariably motors failed *mechanically* before they failed electrically! Hence, the F-M pioneering of *mechanical excellence!* Electrically, there is little to choose between standard types of motors of various makes — *mechanically* there is a world of difference.

Fairbanks-Morse pioneered the Ball Bearing motor as a mechanical means of adding longer service and reducing maintenance. It has pioneered design and manufacturing methods which in service records of scores of plants have proven the soundness of F-M superiority in mechanical construction.

The extra value built into these motors is at once evident to the motor-experienced executive who investigates. We shall be glad to send descriptive bulletins or arrange for actual demonstration. Address Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 32 Branches at your service throughout the United States.

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How External Chills Regulate Cooling of Steel Castings

BY RALPH BURKE

GROWING demand in recent years for better and more uniform physical properties in steel castings has prompted a study of means toward producing, within all parts of a casting, the same physical properties as obtained from a separately cast test bar from the same heat.

Exacting requirements due to higher speeds, heavier loads and increased pressures, and the necessity of limiting the weights for economy and practicability, have placed new responsibilities on the designing engineer and on the steel foundryman. The rapidly growing practices of making impact tests, X-ray inspections, and proof tests with strain-gages or to destruction indicate the demand on the part of engineers for sound castings.

Physical properties, particularly those indicating ductility and impact value are seldom as good when taken from a casting as when taken from a separately cast test bar from the same heat. One of many reasons is that usually it is more difficult to feed or pour the section from which the test piece is taken than it is to feed a separately cast bar.

Uniform Cooling Sought

The principal function of a chill for steel castings is to promote a uniform rate of cooling in all sections, by increasing the rate of cooling in heavy sections so that they come to a solid state simultaneously with the lighter adjacent sections. External chills may be used to regulate the rate of cooling the metal. The thickness of chill and the area covered may vary within reasonable limits and accomplish the desired result. Naturally, the thickness of chill is based on the thickness of casting section, and its relation to the thickness of adjacent sections. Chills placed near the gate must be heavier than those farther away.

Checking or cracking of the casting surface next the chill face is one of the difficulties sometimes encountered in using external chills. This can be caused by using a heavy chill, a rough chill, or in any way allowing the casting surface to adhere to the chill face, preventing contraction on cooling. Chills must be smooth, and protected by a covering to prevent adherence of the steel. A satisfactory method is to paint the chill with shellac, and dip it while still wet in fine, dry sand. This can be repeated if a heavier coating is needed. The sand coating not only prevents the molten metal from adhering, but tempers the severe initial chilling action, and assists in preventing surface checks. A small tumbling barrel will serve to keep the chills clean and smooth.

In some instances contraction causes the casting to crack at the periphery of the external chill. This tendency is reduced by chamfering the edges of the chill, as shown in Fig. 1 below.

For any except a flat surface, chills should be cast from a chill patttern made to fit the casting surface. These chills impart a better finished appearance, save cleaning room labor and are well worth the cost.

Another function of external chills is to replace sharp corners and sharp edges of sand. Many defects at intersections in steel castings, usually termed *shrinks*, actually are caused by gases, concentrated at these sharp points or edges. They can be eliminated by the use of external chills cast to accurately fit the pattern, as in *A*, Fig. 2. Where a rod is used for the chill, the thin edge of sand as shown at *B* will break off under the action of the molten metal. This not only causes local dirt, but the reaction of the loose sand particles on the molten metal evolves a lot of gas. Corner chills will not stick if suitably coated with shellac and dry sand.

The proper use of external chills will enable the foundryman to increase yield of good castings by reducing the size of risers. However, probably the safest practice, and the most economical, for regular carbon steel castings is to confine the use of external chills to sections otherwise difficult or impossible to feed by risers. With certain alloys not recoverable on re-melt, the use of external chills to increase yield may be profitable. Certain alloys are subject to cracking if cut with a torch while cold, or when being ground. If risers on these castings can be reduced by the use of external chills, this hazard may be greatly reduced.

Sections Often Unsound

A thorough investigation into the solidity of intersections of steel castings at times will disclose sections not as solid as supposed. Where the apparently sound metal as indicated by a saw cut may appear convincing, an etching of the surface often will disclose unsoundness. These investigations have led to the use of external chills even where internal chills formerly were not considered necessary. In extremely heavy sections this unsoundness is more pronounced, having, in addition to possible cavities, an enlargement of grain size. Due to the mass of these sections, the coarseness is difficult to correct by heat treatment. In these cases external chills are extremely valuable. In most alloy steels, especially those high in chromium or manganese, the sponginess of intersections is more pronounced than in carbon steels. In these cases, the use of external chills is doubly important.

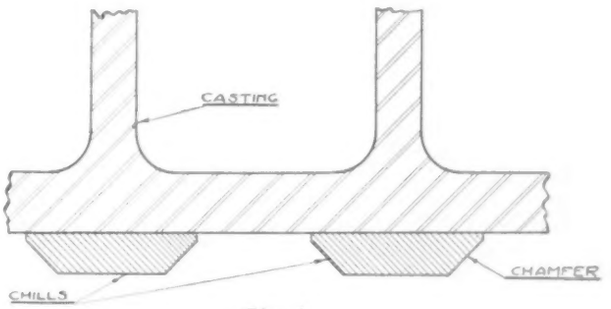


FIG. 1

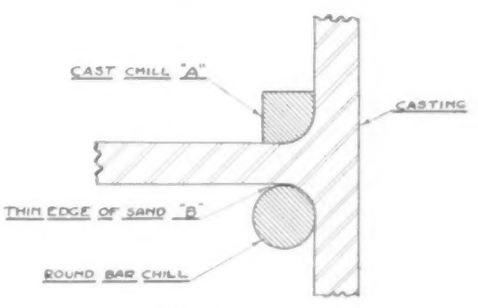
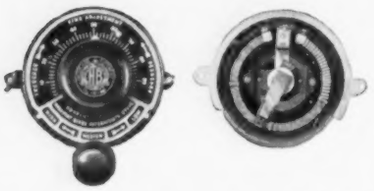


FIG. 2

FIG. 1—Cracking at periphery of chill may be reduced by chamfering. Fig. 2—External chills may be cast to fit the pattern accurately

Remote Control for Welders—Hobart Brothers, Troy, O., recently announced that their engineers in an effort to make the remote control which has proved satisfactory on Hobart machines, give a finer adjustment, have perfected a new volt amp adjuster. It now is standard equipment on all machines built by the company. This new improvement, illustrated herewith, gives the operator more than 140 combinations of voltage and welding current, right at the finger tips, no matter how far he is working away from the machine, for each of the machine ranges; therefore, approximately 430 different combinations are available, one-third of which may be selected without going near the machine when using the remote control feature. The company declares that the addition of the volt amp adjuster has made



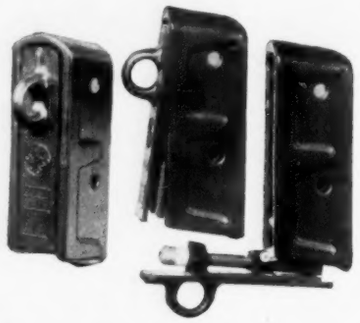
Volt amp adjuster developed for Hobart Bros. welding machines

the already close control of its welders, even closer, giving greater flexibility and advantages on all kinds of welding work.

♦ ♦ ♦

Fuse Cutout—General Electric Co., Schenectady, N. Y., recently brought out a new porcelain-enclosed cutout, which gives positive evidence that the circuit is open either by the conventional drop-out method or by a new method which affords visual indication of a blown fuse link by partially opening the door of the cutout at the lower end. Since the new indicating feature allows the bottom of the door to protrude only about 1¼ inches when the fuse is blown, the live contacts and mechanism are not exposed to the weather.

The cutout, rated at 5000 volts, 60 amperes, with an interrupting capacity of 1500 amperes (rms.), is easily convertible from the new indicating action to drop-out action, merely by removing, with the fingers, a small wire yoke from the mechanism. When the device, shown herewith, is employed as a conventional drop-out cutout, a time-delay feature, provided by a spring-latching mechanism, causes the current to be broken in the fuse holder before the contacts open; thus it assures freedom from burned contacts and possible destruction of the cutout.



General Electric enclosed indicating and drop-out fuse cutout

A spring-driven lever arm to which the fuse link is fastened pulls even the largest sizes of fuse links out of the fuse holder when the currents are too small to produce expulsion action. In this way, indicating or drop-out action is assured. The lever also forms part of the door hinge, both of which are electrically isolated when the door is open.

♦ ♦ ♦

Continuous Scale-Free Hardening Furnace — Electric Furnace Co., Salem, O., recently developed a special atmosphere, continuous chain belt conveyor furnace for the scale free hardening of miscellaneous small and medium size products. The material to be treated is fed on to a rugged, cast link belt conveyor, conveyed through the furnace in a special protective atmosphere and discharged through a sealed chute to quench. The material comes out absolutely free from scale, the company declares.

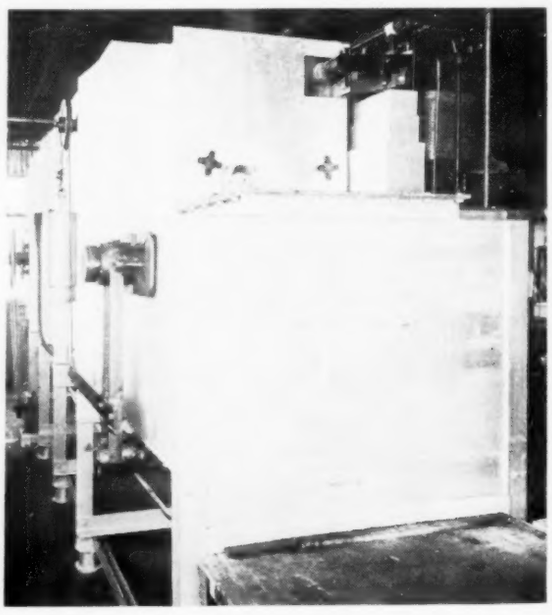
A combustion type generator is provded with the furnace for supplying the special protective atmosphere used in the equipment. This type of furnace also may be used for bright annealing, clean annealing and the brazing or joining of metal parts. The accompanying illustration shows the charging end of the furnace.

♦ ♦ ♦

Grinding Machine—Rivett Lathe & Grinder Corp., Brighton, Mass., has designed a grinding machine that can be employed for grinding internally or externally. The machine which is shown in the illustration on page 58, was built to meet a demand for a grinder suitable for precision tool making and accurate manufacturing, and has a turret type attachment incorporating both internal and external grinding mechanism whereby the two operations can be performed on the work with one setting.

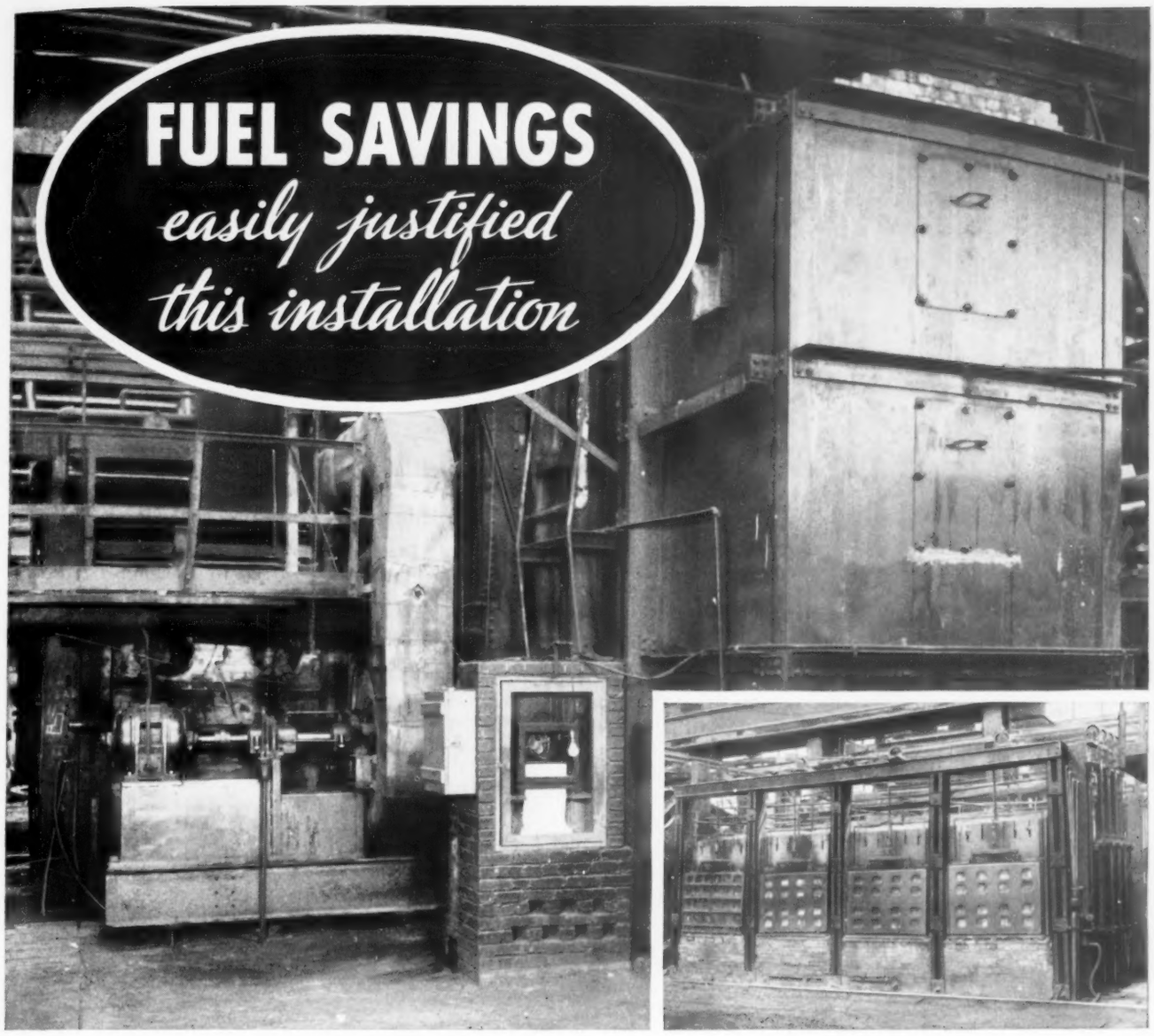
Reciprocating mechanism is mounted in the base of the machine and consists essentially of a tapered heart-shape cam so designed as to accelerate and retard movement of the table. The cross slide is gibbed to the dovetail ways, and the two-station vertical face turret carrying internal and external grinding spindles is mounted on the cross slide. A handle is provided for indexing the turret and a spring actuated locking pin locates each spindle in the correct position for work. Two substantial ball handles rigidly clamp the turret in working positions.

Driving pulleys are proportioned to



CHARGING end of continuous scale-free hardening furnace developed by Electric Furnace Co. This type of unit may be employed for bright annealing, clean annealing and the brazing or joining of metal parts. Material to be treated is fed on to a cast link belt conveyor, transported through the furnace in a special protective atmosphere and discharged through a sealed chute to quench

FUEL SAVINGS *easily justified this installation*



Recuperator Applied to Four-Door Reheating Furnace—Note "hot" fan handling air at 900° F.

Charging Side of Recuperative Four-Door Reheating Furnace

OF course you are interested in fuel savings. And so were the engineers in a Pittsburgh District Steel Plant.

For that very important reason they installed this Carborundum Company Recuperator—equipped with tubes of Carbofrax, the Carborundum Brand Silicon Carbide Refractory.

The recuperator applied to a four-door reheating furnace, preheats all their combustion air to about 900° F. for natural gas and oil fuel. In the furnace they handle miscellaneous sizes of billets with hot and cold charging on a solid hearth. They operate on a 24-hour schedule. The fuel savings effected more than justified the investment. Let us send you information on how to save fuel in your plant.

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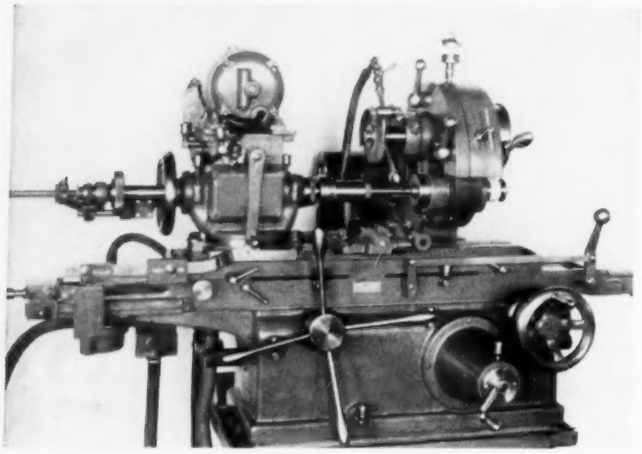
A Product of* THE CARBORUNDUM COMPANY *Perth Amboy, N. J.

(REFRACTORY DIVISION)

District Sales Branches: Boston, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh. Agents: L. F. McConnell, Birmingham, Ala.: Christy Firebrick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas; Williams and Wilson, Ltd., Montreal, Toronto, Canada. (Carborundum and Carbofrax are registered trade-marks of The Carborundum Company.)



GRINDING machine introduced by Rivett Lathe & Grinder Corp., can be employed for grinding internally or externally. Turret head attachment carries both internal and external grinding spindles which are indexed to the proper working positions

give proper wheel speeds and to permit use of a single endless belt for both internal and external grinding. When the turret is indexed, the tension of the belt is relieved, the belt transferred by hand from one spindle to the other and when the turret has reached its new position, proper tension has been applied to the belt. When one spindle is running the other is at rest, saving power and avoiding danger from a free-running wheel.

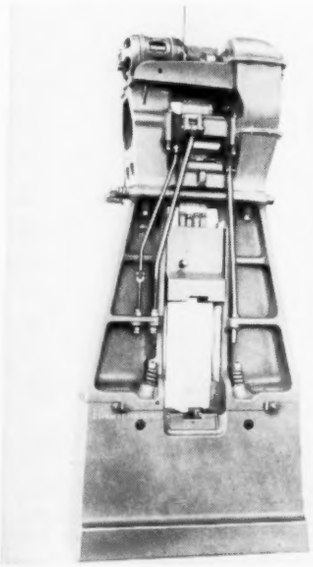
The work head is mounted on a plate accurately fitted to the top part of the table and can be set at various locations on the table depending on the requirements. It is bolted to the table by two t-bolts engaging a t-slot in the top of the table. Base of the work head is graduated in degrees so that the head can be set at an angle for taper grinding when the taper is steeper than can be secured by swivelling the table. Work head spindle is threaded for chucks, face plates, etc., and the mouth is ground to take collets and split step chucks operated by a screw, draw-in spindle.

A motor mounted directly on the work head drives the spindle which is started and stopped by a clutch operated by a control lever on the front of the work head. When the lever is moved to the stop position, a brake is applied automatically, stopping the spindle. The control lever is connected so that adjustable dogs can be set to start and stop the spindle automatically as the table is moved from the loading to the grinding position, etc.

◆ ◆ ◆

Board Drop Hammer—Chambersburg Engineering Co., Chambersburg, Pa., recently announced a new board drop hammer designated model J. The unit, shown herewith, incorporates a number of new features, chief of which is the use of a nickel molybdenum alloy for frames and anvil. This alloy, known as Cecolloy, is made in Chambersburg's redesigned air furnaces and shows similar damping properties to ordinary cast iron, but with a tensile strength in excess of 50,000 pounds.

Among refinements embodied in the hammer is an extremely simple motor-driven head, consisting of only two main sections, which house the eccentrics, rolls and driving mechanism, with a cap to close the gear box. Driving mechanism is practically a spur-geared reducer, the gears being of heavy pitch with wide face. Motor is rigidly connected to the head and coupled to the driving mechanism by a flexible coupling. The anvil (a Cecolloy casting) has a ratio of 20 to 1 to falling weight and secures and maintains alignment by non-twisting, non-rocking frame-to-anvil connections, and by a patented cross guided joint. Frames are heavy, rigid, non-rocking members with integrally cast guides, the Vees being much longer, and widely spaced to combat any twisting tendency.



Model J board drop hammer announced by Chambersburg Engineering Co.

The front rod is closer to the frame and is protected from vibration by a steel-armored rubber bushing at the top and by a wide-faced steel shoe plus heavy padding at the bottom. A rod, said to give universal and quicker adjustment, replaces the usual notched rack for adjusting the releasing lever position. Greater speed, more accurate forgings, less down time and lower costs are claimed for this hammer.

◆ ◆ ◆

Measuring Instrument — Federal Products Corp., Providence, R. I., recently has developed and placed on the market a new precision measuring instrument which is shown in the accompanying illustration. It is a two-point contact, dial micrometer, plug gage for measuring accurately small diameters as well as detecting out-of-round, bell mouth and taper condition. According to the manufacturer, plugs can be supplied for any size from 0.200-inch up to and including 1½ inches. The plugs can be changed in less than one minute and the standard length range is from 2¾ to 5¾, but special lengths can be supplied for longer or shorter holes if desired.

Federal bench type gage operated by hand or foot lever control

The bench type gage shown in the accompanying illustration can be operated either by hand or by foot lever control. Also for those who prefer a portable type gage, it can be supplied with a pistol grip in place of the stand. The indicator is graduated in 0.0001-inch, and the dial is movable for setting.

◆ ◆ ◆

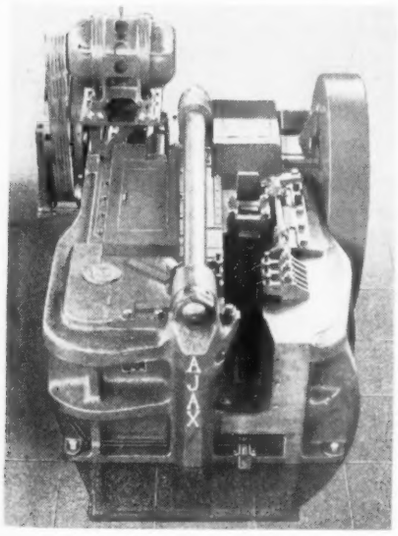
Forging Machines—Ajax Mfg. Co., Cleveland, recently announced the completion of a new line of air clutch forging machines. The line consists of seven standard sizes rated from 2 to 7 inches inclusive, and anticipates the construction of a "super" size where required, shipping facilities permitting.

Increased productive capacity is due to the improved operating con-

veniences of the machines generally, and principally to the employment as standard equipment on all sizes of an air clutch. This clutch is a development of the Ajax company, and was described in STEEL, Nov. 27, 1933. Engagement of the clutch is without fatigue to the operator, calling for simply the opening of an air valve from conveniently located foot pedal. At a predetermined point in the operating cycle the air is exhausted, releasing the clutch, and an air-released, spring-set brake stops the machine on open stroke. This clutch also makes it possible to "inch" machines of all sizes for die setting.

The frames of these machines are of steel casting and of extreme rigidity, capable of holding their alignment and minimizing elongation and distortion under the heavy operating loads to which they are subjected. All sizes have heavy sub-floor reinforcement and a large diameter, lengthwise tie rod spanning the die slide way. An innovation on the 6-inch and larger sizes is the introduction of two stage gearing, which permits employment of a main gear and flywheel of moderate size, economizing floor space. The illustration below shows the 5-inch machine with complete guards.

By locating the outboard bearing of the header slide beneath the crankshaft at the extreme rear of the frame, complete accessibility to the pitman and particularly its important main eccentric pin bearing is afforded. The outboard guide of the die slide is located beneath and to the right of the stationary die seat avoiding a goose-neck effect with its attendant flexibility, and is



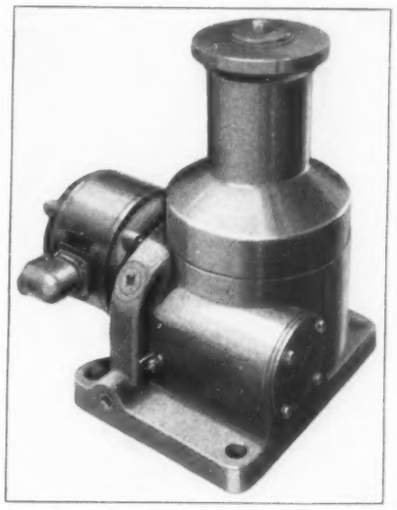
Ajax 5-inch forging machine showing complete guards

kept free from water and scale accumulation through the use of protecting shrouds. A take-up is provided on the guide bearings of both slides to offset the wear caused by the highly abrasive steel scale.

♦ ♦ ♦

Motorized Car Spotter—Link-Belt Co., Chicago, announces that its vertical-capstan electric car spotter will hereafter be furnished "motorized." This means that the motor will be attached direct to side of spotter housing, with the result that no motor shaft coupling or separate motor base plate will be required. With the motor bolted to side of spotter housing, as shown herewith, proper initial and permanent alignment of motor shaft is assured; and the plan measurements of foundation required are a minimum.

The motor shaft extends into a substantial one-piece housing, which con-



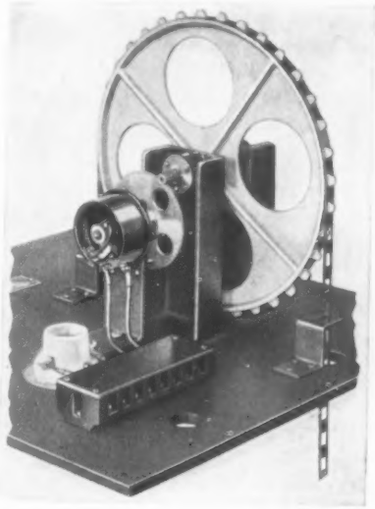
Motorized car spotter now can be furnished by Link-Belt Co.

tains all gears—a helical-gear reduction at motor, and a worm-gear set. The gears run in oil, and are readily accessible. The motor is of high-torque fully enclosed type, and can be removed as a unit complete with motor pinion, without disturbing the rest of the machine. The capstan is machine finished to prolong the life of the car haulage rope. This motorized spotter, like its predecessor, is available in two sizes. The smaller machine has a rope pull of 5000 pounds, and the larger size, 10,000 pounds.

♦ ♦ ♦

Telemetering System—Bailey Meter Co., 1050 Ivanhoe road, Cleveland, recently introduced a new telemetering system in which an electronic relay plays an important part by transforming minute electrical currents into useful forces. The system was developed for measuring pressure, temperature, liquid level, etc. at distant locations.

The electronic relay-operated galvatron receiving element is mounted in a neat appearing moisture-proof pressed steel casing and records as many as four factors on one



Transmitting element of Bailey Meter telemetering system

12-inch diameter circular chart. The transmitting element consists principally of a variable resistance unit which is operated by the metering device. In the case of a float operated transmitter for liquid level, a float, by means of a perforated metal tape, operates a sprocket which moves the rheostat. When necessary, an electric bulb is provided to prevent frost from forming on the resistance unit. This type of transmitting element is illustrated herewith.

For distances up to ten miles, accuracy to within 1 per cent scale reading can be obtained by using a three-wire connection between the metering device and the remote recording apparatus with telephone lines or their equivalent as the transmitting medium. Only a small amount of current is required for this system because a vacuum tube system amplifies the transmitted power a sufficient degree to assure positive operation of the equipment.

When it is desired to transmit indications for more than three miles and where only two wires may be used, a potentiometer circuit is recommended. An important advantage of this system is that additional records up to four can be obtained with the addition of only 1 wire per record. Thus two records will require three transmission wires.

New Trade Publications

METALS—J. M. & L. A. Osborn, 1541 East Thirty-eighth street, Cleveland, has issued its stock list No. 34, of metals and metal products.

DIE CASTINGS—Doehler Die Casting Co., Smead and Prospect avenues, Toledo, O., has published a booklet entitled "Brass Die Castings with Strength of Steel."

BRONZE BARS—Aluminum Industries Inc., Cincinnati, is distributing a circular on its Permite leaded phosphor bronze bars, for lathe or screw machine production.

STEEL CHISELS—Edgar Allen & Co. Ltd., Sheffield, Eng., in a current bulletin sets forth advantages of its chisel steels for pneumatic and hand use on all materials.

TRANSFORMERS — Pennsylvania Transformer Co., 1701 Island avenue, Pittsburgh, has issued a 4-page circular, No. 300, describing its improved distribution transformers.

SCREW STOCK—A bulletin by Bliss & Laughlin Inc., Chicago and Buffalo, describes its ultra-cut screw stock for fast cutting and production in a current bulletin. It is illustrated.

INSULATING FIRE BRICK—Data on the properties and application of its line of insulating fire brick are contained in a bulletin recently issued by the A. P. Green Fire Brick Co., Mexico, Mo.

TRAMRAIL SWITCHES—Cleveland Crane & Engineering Co., Wickliffe, O., in a current bulletin covers the subject of its tramrail switches for industrial uses, with illustrations of installations.

GRINDERS — Standard Electrical Tool Co., 1938-46 West Eighth street, Cincinnati, has published its catalog No. 37 dealing with electric grinders, buffers and drills. Grinders include a wide variety of portable, bench and stand types.

INDUSTRIAL EQUIPMENT—R. C. Mahon Co., Detroit, has issued an illustrated booklet describing some of the special machines it has built to give automatic production in industry, through its specialized engineering service. It is well illustrated.

MOTOREDUCER—A bulletin, No. 272, has been issued by the Falk Corp., Milwaukee, devoted to description of its two-speed motoreducers, bringing into one bulletin various data relating to those devices. Installation and application illustrations show a variety of uses.

GEARS—Philadelphia Gear Works, Erie avenue and G street, Philadelphia, has issued a catalog of its various gears, pinions, speed reducer units, electric hoists and various other devices. It is illustrated and contains tables of data of use to the user of gears.

GAS PRODUCER—Production of inert gas is described in bulletin No. 10C-B12 by the Roots-Connersville Blower Corp., Connersville, Ind. This gas contains less than 1 per cent oxygen and no carbon monoxide when operating on natural or manufactured gas or fuel oil.

CONVEYORS—Mathews Conveyor Co., Elmwood City, Pa., has issued a loose-leaf catalog of its products, to serve engineers and engineering departments in furnishing specifications and plans for materials handling equipment. It is completely illustrated with drawings and halftones.

AIR CONDITIONING—"It's In The Air," is the subject of a booklet recently issued by the General Electric Co., Schenectady, N. Y., devoted to its line of air-conditioning equipment. The text is well illustrated with reproductions of photographs of both commercial and residential buildings in which air conditioning has been installed.

AIR DRYER—Removing moisture and oil from compressed air and the reasons for its elimination are discussed in a leaflet by the Ruemelin Mfg. Co., 1570 South First street, Milwaukee. Automatic operation eliminates oversight. A table of capacities and dimensions is given. Illustrations show operation of the device.

GRINDING WHEELS — Dressing and truing of grinding wheels form the subject of a booklet by the Carborundum Co., Niagara Falls, N. Y., designed to show the way to better performance in grinding through keeping the wheels in condition. It contains much information useful to the user of grinding wheels.

ROLLS—Ohio Steel Foundry Co., Lima, O., in a current booklet describes its various types of mill rolls, made of Ohioloy, and its line of rolling mill castings. Prices and terms are included. Illustrations show the various types of rolls produced, a supplementary line being delineated at the bottom of the pages, not the least interesting.

SCREW STEEL—An improved steel for automatic screw machine production of parts is presented in a leaflet by the Union Drawn Steel Co., Beaver Falls, Pa. Actual performance records are given to show gains in production and lowering of cost. Another publication by this company presents its precision turned and ground shafting, with advantages from its use.

ZINC-ALLOY SHEETS—Inland Steel Co., Chicago, has published a folder describing and illustrating uses of its zinc-alloy sheets. These are distinguished from galvanized sheets by the fact the zinc is alloyed to the steel base, without a distinct dividing line, allowing fabricating and forming without flaking. Other advantages are shown.

METERS — Worthington-Gamon Meter Co., Harrison, N. J., has issued five bulletins on various types of its water meters, as follows: M-975-B12, watch dog disc meter, frostproof, with open gear train; B13, same, with enclosed gear train; B14, same, with split case, open gear train; B15, same, with enclosed gear train; B16, model R disc meter.

PNEUMATIC TOOLS—Ingersoll-Rand Co., Phillipsburg, N. J., has published a bulletin on its line of pneumatic tools, including grinders, drills, riveters, chippers, rammers, wrenches and hoists. Information includes size-and-capacity tables of the various tools.

PACKINGS—Johns-Manville, 22 East Fortieth street, New York, has published a catalog describing its line of packings for practically any industrial service. The text includes packing recommendations, a discussion of methods to secure the best results from packings, approximate weight of packings, etc. A page is devoted to the company's line of refractory cement.

ELECTRIC FURNACES — A lift-and-swing-aside roof type quick-charge electric melting and refining furnace is described and illustrated in a bulletin recently published by the Pittsburgh Lectromelt Furnace Corp., foot of Thirty-second street, Pittsburgh. Drawings show details of construction and operation, and the text points to advantages of the furnace in reducing intervals between heats.

NICKEL—A booklet on applications of Monel metal, nickel and nickel-clad steel has been issued by the technical service department of the International Nickel Co., 67 Wall street, New York. Its contents include data on the physical and mechanical properties of these metals and much miscellaneous information, including instructions on selection of suitable welding rod and other details on fabrication.

HEAT TREATING—R. & H. Chemicals department, E. I. Du Pont de Nemours & Co. Inc., Wilmington, Del., has published a manual for heat treating steels with cyanides and salts. Information covers procedure to be followed in case hardening, reheating, nitriding and mottling steels with sodium cyanide. It also includes procedure for coloring, tempering and drawing steels with heat treating salts.

ACETYLENE FLAME—Linde Air Products Co., 30 East Forty-second street, New York, has published a bulletin entitled "101 Uses for the Air-Acetylene Flame." The text points out that the air-acetylene flame does not take the place of the oxy-acetylene flame, but serves as a supplementary tool for use where lower flame temperatures are required. The company also has published a bulletin on "Maintenance of Reciprocating Parts."

STRAIN GAGE AND TESTING MACHINE—Recent bulletins by the Baldwin-Southwark Corp., Southwark division, Philadelphia, include No. 78, devoted to Carpenter torsion impact testing machine, which describes the machine, tells its functions and shows by means of graphs results in tests of hardened steels; No. 71, describes the Whittemore strain gage for the measurement of strain, discussing reliability of readings and temperature effects.

Stronger Tone in Markets and Steelworks Rate

Richberg's Assurance of Code Stability Allays Price Uncertainty—Official Intimations of Inflation a Factor—Pig Iron and Coke in Greater Demand

ALTHOUGH two weeks of the fourth quarter have elapsed without any large commitments from leading consumers, the trend in buying as measured by volume of miscellaneous orders is upward, and steelmakers are confident of a substantial improvement once the automobile industry has launched definitely on its new models.

From present indications, steel specifications from automobile manufacturers should show a measurable gain early in November. While production last week was increased by 6000 cars to 25,000, many automobile plants remained idle, and the industry as a whole is at the bottom of its 1934 schedules. Demand for pig iron from automobile foundries has expanded at a much better rate than has that for finished steel.

Steel markets generally last week reflected the hesitation prevalent pending the statement by Donald R. Richberg on the government's code and price policies; a statement, however, that came too late in the week to afford any gage of its effect on consumers.

His pronouncement that no important changes in the steel code are contemplated dispels some uncertainty regarding prices, but on the other hand it has apparently frustrated the hopes held by leading buyers for a highly-competitive market such as would be certain to result in reductions. Offsetting this, however, the more definite intimations of impending inflationary measures are expected to stimulate buying as a hedge against the consequences of inflation.

Steel Output Is Being Absorbed Quickly; Action Slow on Many Large Public Projects

Undoubtedly the strongest feature of the markets from producers' standpoint is the universal absence of consumers' stock; the fact that material being shipped today is going immediately into consumer goods—providing a sound basis for a broad improvement in iron and steel demand.

With inventory-time approaching, however, it appears unlikely that buying over the remainder of the year will far outstrip actual requirements. Much depends upon how the automobile manufacturers will appraise markets for new cars, and how quickly some of the large government construction projects can be released.

Though there are several hundred thousand tons of structural steel pending in these projects, already figured and awaiting awards, structural lettings last week dropped to 15,481 tons. Government advances for home construction and renovizing have not yet distinctly benefited steel, though expected to make more headway. The navy has postponed to Nov. 2 bids on 3540 tons for its yards, and is holding up more than 1000 tons of plates on which bids were opened over a month ago.

Japan estimates 100,000 tons of steel will be required to rebuild the typhoon-swept city of Osaka. American farm implement makers' sales in the first eight months this year were about 85 per cent over 1932, the low mark in recent years, and they are increasing their steel purchases moderately.

Raw Materials More Active; Railroads To Equip 2,000,000 Cars with New Airbrakes

Merchant pig iron, and foundry coke shipments are gaining steadily; in the Great Lakes district so far in October 140 per cent for pig iron and 33 per cent for coke, over the comparable period last month. Such activity as noted in scrap is largely in demand for foundry grades.

A large tonnage of pig iron will be required through the railroads decision to re-equip 2,000,000 freight cars with a new type of airbrake, at the rate of 200,000 annually. Early action may be taken by the Pennsylvania on 58 electric locomotives. A Sharon, Pa., tank car builder has booked orders for 75 complete tank cars and 40 tanks.

Steel ingot output in Great Britain in September, 734,000 tons, increased 67,700 tons over August, according to STEEL's London cable. Pig iron production declined 3000 tons to 500,300 tons.

Steelworks operations last week were unchanged on the strong side of 25 per cent. Chicago held at 26; Pittsburgh 18; Detroit 59; Wheeling 33; Cleveland 28; Buffalo 24; Birmingham 25; New England 40. Youngstown was up ½-point to 29½ and eastern Pennsylvania ½-point to 17½ per cent.

STEEL's iron and steel price composite is unchanged at $32.09; the finished steel index remains $54, while the iron and steel scrap figure is up 4 cents to $9.37 on some minor adjustments at Pittsburgh.

COMPOSITE MARKET AVERAGES

	Oct. 13	Oct. 6	One Month Ago Sept., 1934	Three Months Ago July, 1934	One Year Ago Oct., 1933	Five Years Ago Oct., 1929
Iron and Steel Composite	$32.09	$32.09	$32.15	$32.32	$30.53	$35.85
Finished Steel Composite	54.00	54.00	54.00	54.05	49.20	56.79
Steelworks Scrap Composite	9.37	9.33	9.45	10.30	10.37	15.44

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average forLast Month, Three Months and One Year Ago

	Oct. 13, 1934	Sept. 1934	July 1934	Oct. 1933
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.80	1.75
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.65
Wire nails, Pittsburgh	2.60	2.60	2.60	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	28.00	28.00	26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00

	Oct. 13, 1934	Sept. 1934	July 1934	Oct. 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.76	19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	17.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	17.76
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.54
Gray forge, del. Pittsburgh	18.88	18.88	18.88	18.38
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	87.24
Scrap				
Heavy melting steel, Pittsburgh	$10.25	10.75	12.00	12.45
Heavy melt. steel, No. 2, east. Pa.	8.00	8.00	8.40	9.20
Heavy melting steel, Chicago	8.75	8.65	9.55	9.35
Rails for rolling, Chicago	9.75	10.05	10.85	11.10
Railroad steel specialties, Chicago	9.75	9.80	10.50	10.50
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	3.25
Connellsville, foundry, ovens	4.60	4.60	4.60	3.85
Chicago, by-product foundry, del.	9.25	9.25	9.25	8.75

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del.	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Francisco, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., stock	$4.90
Long ternes, No. 24 unassorted	3.40c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chicago or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05¼c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.....	1.75c
Chicago	1.80c
Philadelphia, base..	1.89c
Pittsburgh, refined..	2.75c-7.50c

REINFORCING

New billet, cut lengths, c. l.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young....	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.....	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve., 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer..	5 10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire....	2.80c
Woven wire fencing (base column, c.l.).....	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago, up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.....	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot) □

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo.....0.50
4600 .20 to .30 Mo. 125-1.75 Ni. 1.05
5100 .80-1.10 Cr. 0.45
5100 Cr. spring .....base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250....Carbon base plus extras

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops □

Hot strip to 23⅞-in.	
Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham, base	2.00c
Detroit, delivered	2.05c
Phila., delivered..	2.14c
New York, del ..	2.18c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip,	
Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$27.00
50-60 lbs.	$24.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pittsb., Chi..	$35.00
Do., reroll. qual..	$34.00
Angle bars, mills....	2.55c
Spikes, R. R. base..	2.40c
Track bolts, base....	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thrd....	70-10-10 off
Rolled thread, ½ x 6 and smaller	70-10-10 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts.....	70-10-10 off
Tire bolts	60-10 off
Stove bolts, 75 off in pkgs.; 83 off in bulk, 15,000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller	70-10-10 off
Step bolts	70-10 off
Elevator bolts	70-10 off

NUTS

S.A.E. semifinished hexagon; ½ to ⅞-inch,	70-10-10 off
Do., ½ to 1-inch	75 off
Do., over 1-inch	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller....	75-10 off
Do., larger than 1-in..	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago ⅞-in. and smaller,	3.00c
Pitts., Chi., Cleve..	70 and 5 off
Wrought washers, Pitts., Chi., Phila..	6.00 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel

In.	Blk.	Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25 7½
2	41½	26

LAP WELD

Steel

2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel

½, butt weld	57½
⅛-inch, but weld	50½
¼—⅜, buttweld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63

Iron

⅛—1½-inch, black and galv. take 4 pts., over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham..	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago..	46.00-47.00
3-in & over, east fdy	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B. Stnd. fitgs., Birm. base..$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown..	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md., ..	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur	$3.60- 3.85
Connellsville, fdry....	4.60
Connell. prem. fdy.	5.10
New River fdry	6.00
Wise county fdry..	4.45- 5.25
Wise county fur.....	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, Del...	10.50
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	19.00c
90 per cent benzol	19.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York

Phenol (200 lb drums)..	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

†Naphthalene flakes and balls, in bbl.	6.00c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia.....	$1.20

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	.....	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmghm.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem	20.89	21.39	.....	.....
Philadelphia from Birmingham	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50

†Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.25	Lake Superior fur.	21.00
Pitts. dist. fur.	18.25	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00
Intermediary	36.00
Second quality	25.00
MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b Chewelah, Wash.	22.00
BASIC BRICK	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel, f.o.b. Ill., Key., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. fur. spot†	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper

Sheets

Yellow brass (high)	14.50
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.50
Zinc, 100-lb. base	9.50

Tubes and Pipes

High yellow brass	17.00
Seamless copper	17.25

Rods

High yellow brass	13.00
Copper, hot rolled	13.25

Anodes

Copper untrimmed	13.75

Wire

Yellow brass (high)	15.00

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass

*New York	4.00- 4.25
Chicago	4.00- 4.25
*Cleveland	4.25- 4.50
*St. Louis	4.00- 4.25

Heavy Copper and Wire

*New York	5.00- 5.25
Chicago, No. 1	5.25- 5.50
*Cleveland	5.00- 5.25
*St. Louis	4.75- 5.00

Composition Brass Borings

*New York	3.75- 4.00

Light Copper

*New York	4.00- 4.37½
Chicago	3.87½-4.12½
*Cleveland	4.25- 4.50
*St. Louis	4.00- 4.25

Light Brass

Chicago	1.87½-2.12½
*Cleveland	2.25- 2.50

Lead

New York	2.75- 2.87½
*Cleveland	2.37½-2.62½
Chicago	2.62½-2.87½
*St. Louis	2.60- 2.75

Zinc

New York	1.75- 2.00
*Cleveland	1.75- 1.85
St. Louis	2.50- 2.60

Aluminum

Borings, Cleveland	6.00- 7.00
Mixed, cast, Cleve.	10.25-11.00
Mixed, cast, St. L.	9.25-10.25
Clips, soft, Cleve.	12.00-13.00

Secondary Metals

Brass ingot, 85-5-5-5	8.25
Stand. No. 12 Alum.	14.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL	
Birmingham	8.00- 8.50
Boston, dealers	5.00- 5.25
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	8.50- 9.00
Chicago, No. 1	8.50- 9.00
Cleveland, No. 1	8.00- 8.50
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1	7.50- 8.00
Detroit, No. 2	6.50- 7.00
Eastern Pa.	9.50- 9.75
Eastern Pa., No. 2	8.00- 8.50
Federal, Ill.	7.00- 7.50
Granite City, R. R.	7.25- 7.75
Granite City, No. 2	6.25- 6.75
N. Y., deal. R. R.	8.00
N. Y., deal. No. 2	6.50
Pittsburgh, No. 1	10.00-10.50
St. Louis	6.50- 7.00
Valleys, No. 1	10.50
COMPRESSED SHEETS	
Buffalo, dealers	8.50- 9.00
Chicago, factory	7.75- 8.25
Cleveland	7.00- 7.50
Detroit	7.50- 8.00
E. Pa., new mat.	9.00- 9.50
Pittsburgh	10.25-10.75
St. Louis	5.00- 5.50
Valleys	10.00
BUNDLED SHEETS	
Buffalo	6.50- 7.00
Cincinnati, del.	6.00- 6.50
Cleveland	6.50- 7.00
Pittsburgh	8.25- 8.75
St. Louis	4.00- 4.25
SHEET CLIPPINGS, LOOSE	
Chicago	4.00- 4.50
Cincinnati	4.50- 5.00
Detroit	4.50- 5.00
St. Louis	3.50- 4.00
STEEL RAILS, SHORT	
Birmingham	10.00-10.50
Buffalo	12.00-12.50
Chicago (3 ft.)	9.50-10.00
Chicago (2 ft.)	11.00-11.50
Cincinnati, del.	9.75-10.25
Detroit	10.00-10.50
Pitts., open-hearth, 3 ft. and less	13.00-13.50
St. Louis, 2 ft. & less	10.00-10.50
STEEL RAILS, SCRAP	
Boston	5.00- 5.25
Chicago	8.50- 9.00
Pittsburgh	10.00-10.50
STOVE PLATE	
Birmingham	5.50- 6.00
Boston, dealers	3.25- 3.75
Buffalo	8.50- 9.00
Chicago, net	5.50- 6.00
Cincinnati, dealers	5.00- 5.50
Detroit, net	6.00- 6.50
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.00- 5.50
COUPLERS, SPRINGS	
Buffalo	12.00-12.50
Chicago, springs	9.50-10.00
Eastern Pa.	12.50-13.00
Pittsburgh	13.50-14.00
St. Louis	8.50- 9.00
ANGLE BARS—STEEL	
Chicago	9.00- 9.50
St. Louis	7.75- 8.25
RAILROAD SPECIALTIES	
Chicago	9.50-10.00
LOW PHOSPHORUS	
Buffalo, billets and bloom crops	11.50-12.00
Cleveland, billet, bloom crops	13.00-13.50
Eastern Pa., crops	13.50-14.00
Pittsburgh, billet, bloom crops	13.50-14.00
Pittsburgh, sheet bar crops	13.00-13.50
FROGS, SWITCHES	
Chicago	8.50- 9.00
St. Louis, cut	8.50- 9.00
SHOVELING STEEL	
Chicago	8.50- 9.00
Federal, Ill.	6.75- 7.00
Granite City, Ill.	6.50- 7.00
RAILROAD WROUGHT	
Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	7.50- 8.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1, net	7.00- 7.50
Chicago, No. 2	8.50- 9.00
Cincinnati, No. 2	7.00- 7.50
Eastern Pa.	10.50
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	5.75- 6.25
St. Louis, No. 2	6.75- 7.25
SPECIFICATION PIPE	
Boston	3.00- 3.25
Eastern Pa.	8.00
New York, dealers	3.50- 3.75
BUSHELING	
Buffalo, No. 1	8.50- 9.00
Chicago, No. 1	7.00- 7.50
Cinci., No. 1, deal.	5.50- 6.00
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	6.50- 7.00
Detroit, No. 1, new	6.50- 7.00
Valleys, new No. 1	9.75
MACHINE TURNINGS	
Birmingham	4.50- 5.00
Boston, dealers	1.25
Buffalo	4.75- 5.25
Chicago	4.50- 5.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.00- 6.50
Detroit	4.50- 5.00
Eastern Pa.	5.00- 5.50
New York, dealers	1.75- 2.00
Pittsburgh	7.00- 7.50
St. Louis	3.00- 3.50
Valleys	7.50- 8.00
BORINGS AND TURNINGS	
For Blast Furnace Use	
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.00- 4.50
Cleveland	6.50- 7.00
Detroit	5.50- 6.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
CAST IRON BORINGS	
Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	5.00- 5.50
Cincinnati, dealers	4.00- 4.50
Cleveland	6.75- 7.25
Detroit	5.50- 6.00
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	5.50- 6.00
St. Louis	3.00- 3.50
PIPE AND FLUES	
Cincinnati, dealers	4.00- 4.50
RAILROAD GRATE BARS	
Buffalo	6.50- 7.00
Chicago, net	5.50- 6.00
Cincinnati	4.00- 4.50
Eastern Pa.	8.00
New York, dealers	4.00- 4.50
St. Louis	4.00- 4.50
FORGE FLASHINGS	
Boston, dealers	3.75
Buffalo	8.50- 9.00
Cleveland	7.00- 7.50
Detroit	6.00- 6.50
FORGE SCRAP	
Boston, dealers	3.75
Chicago, heavy	9.50-10.00
Eastern Pa.	9.00
ARCH BARS, TRANSOMS	
St. Louis	10.00-10.50
AXLE TURNINGS	
Boston, dealers	4.00- 4.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	7.50- 8.00
Cleveland	6.00- 6.50
Eastern Pa.	9.00
St. Louis	6.00- 6.25
STEEL CAR AXLES	
Birmingham	10.00-10.50
Boston, ship, point.	9.50-10.00
Buffalo	12.00-12.50
Chicago, net	10.00-10.50
Eastern Pa.	14.00-15.00
St. Louis	10.00-10.50
SHAFTING	
Boston, ship, point.	10.50-10.75
Eastern Pa.	15.00-15.50
New York, dealers	10.75-11.25
St. Louis	11.00-11.50
CAR WHEELS	
Birmingham, iron	9.00- 9.50
Boston, iron deal.	5.75- 6.00
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	9.50-10.00
Chicago, rolled steel	9.50-10.00
Cincinnati, iron	7.50- 8.00
Eastern Pa., iron	11.00-11.50
Eastern Pa., steel	12.50-13.00
Pittsburgh, iron	10.00-10.50
Pittsburgh, steel	13.50-14.00
St. Louis, iron	7.25- 7.75
St. Louis, steel	8.75- 9.25
NO. 1 CAST SCRAP	
Birmingham	8.50- 9.00
Boston, No. 2	6.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	9.50-10.00
Buffalo, mach.	10.00-10.50
Chicago, agri. net	7.50- 8.00
Chicago, mach. net	8.50- 9.00
Chicago railroad net	8.00- 8.50
Cinci., mach. cup	8.50- 9.00
Cleveland, cupola	10.75-11.25
Detroit, net	8.50- 9.00
Eastern Pa., cupola	11.00
Pittsburgh, cupola	12.00-12.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	6.50- 7.00
St. L., No. 1 mach.	8.50- 9.00
HEAVY CAST	
Boston, del.	4.50- 4.75
Buffalo, break.	7.75- 8.25
Cleveland, break.	7.50- 8.00
Detroit, break.	6.50- 7.00
Detroit, auto net	9.00- 9.50
Eastern Pa.	9.50-10.00
N. Y., break. deal.	5.00- 5.50
Pittsburgh	10.00-10.50
MALLEABLE	
Boston, consum.	10.00-10.50
Buffalo	10.50-11.00
Chicago, R. R.	9.00- 9.50
Cincinnati, agri. del.	7.50- 8.00
Cleveland, rail	10.75-11.25
Detroit, auto	8.50- 9.00
St. Louis, R. R.	7.50- 8.00
Eastern Pa., R. R.	11.50-12.00
RAILS FOR ROLLING	
5 feet and over	
Birmingham	9.50-10.00
Boston, dealers	8.00- 8.50
Buffalo	10.25-10.75
Chicago	9.50-10.00
Eastern Pa.	12.00-12.50
New York, dealer	7.50- 8.00
St. Louis	9.00- 9.50
LOCOMOTIVE TIRES	
Chicago (cut)	9.00- 9.50
St. Louis, No. 1	9.50-10.00
LOW PHOS. PUNCHINGS	
Buffalo	13.75-14.25
Chicago	9.50-10.00
Eastern Pa.	14.50-15.00
Pittsburgh	12.00-12.50

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: N. Y.	Lead: East St. L.	Zinc: St. L.	Aluminum 98-99%	Antimony: Spot, N. Y.	Nickel Cathodes
Oct. 6	9.00	9.12½	8.75	50.75	50.70	3.60	3.45	3.87½	*22.90	9.00	35.00
Oct. 8	9.00	9.12½	8.75	50.62½	50.60	3.60	3.45	3.87½	*22.90	9.00	35.00
Oct. 9	9.00	9.12½	8.75	50.75	50.72½	3.60	3.45	3.80	*22.90	8.87½	35.00
Oct. 10	9.00	9.12½	8.75	50.55	50.52½	3.60	3.45	3.80	*22.90	9.00	35.00
Oct. 11	9.00	9.12½	8.75	50.85	50.82½	3.60	3.45	3.80	*22.90	9.25	35.00

Oct. 12—Holiday

*Nominal range 19.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*....	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga..	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga..	3.31c
Baltimore*....	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga..	3.31c
Chicago 2.10c-	2.60c
Cleveland (c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl...	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young. 2.30c-	2.60c

SHAPES	
Baltimore* ..	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga..	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*....	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga..	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.55c
New York(d)..	3.40c
Philadelphia*	2.95c
Phila. floor....	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*....	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga..	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles..	3.80c
New Orleans	3.55c
New York.....	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*† ..	3.51c
Boston (g)....	3.90c
Buffalo	3.25c
Chattanooga..	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.93½c
Los Angeles..	4.45c
New York.....	3.85c
Philadelphia*†	3.55c
Pitts.** (h)....	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore *†..	4.21c
Buffalo	4.00c
Boston (g)....	4.55c
Chattanooga..	4.86c
Chicago (h)..	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles..	5.05c
New Orleans	4.95c
New York.....	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*....	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga..	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.38½c
Houston	3.25c
Los Angeles..	3.90c
New Orleans	3.95c
New York(d)	3.62c
Philadelphia..	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.80c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia..	3.40c
Pittsburgh(h)	3.20c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore(c)	3.71c
Boston 4.00c-	4.50c
Buffalo (h)....	3.55c
Chattanooga*	4.06c
Chicago (h)..	3.50c
Cincinnati	3.70c
Cleveland(h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York...3.92c-	4.42c
Philadelphia..	3.73c
Pittsburgh(h)	3.45c
Portland (f)..	4.75c
San Fran.(f)(d)	5.95c
Seattle(f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

(b) Plus straightening, cutting and quantoty differentials.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Oct. 11

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
PIG IRON	£ s d		Quoted in gold dollars	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Silicon.	$14.79	3 0 0	$8.03	1 13 0
Basic bessemer	13.31	2 14 0*	7.54	1 11 0
Hematite, Phos. .03-.05	14.91	3 0 6	.....	.....
SEMIFINISHED STEEL				
Billets	$27.12	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage	36.98	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$38.21	7 15 0	$26.77	5 10 0
Merchant bars	1.65c	7 10 0	.69c to .72c	3 2 6 to 3 5 0
Structural shapes	1.62c	7 7 6	.68c	3 1 6
Plates, †¼ in. or 5 mm	1.76c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c	9 5 0	1.16c	5 5 0
Sheets, gal., 24 gage, corr.	2.48c	11 5 0	1.43c	6 10 0
Bands and strips	1.82c	8 5 0	.88c	4 0 0
Plain wire, base	2.04c	9 5 0	1.18c	5 7 6
Galvanized wire, base	2.48c	11 5 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.64c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 4.44	0 18 2	....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$16.64	3 7 6(a)	$13.97	210	$14.60	310	$25.55	63
Basic bessemer pig iron	16.64	3 7 6(a)*	12.30	185	13.42	285	28.19 (b)	69.50
Furnace coke	4.31	0 17 6	7.98	120	5.18	110	7.71	19
Billets	27.12	5 10 0	28.60	430	20.72	440	39.14	96.50
Standard rails	1.82c	8 5 0	2.10c	700	2.31c	1,100	1.43c	132
Merchant bars	1.89c	8 12 0	1.68c	560	1.16c	550	2.02c	110
Structural shapes	1.93c	8 15 0	1.65c	550	1.16c	550	1.98c	109.50
Plates, †¼-in. or 5 mm	1.86c	8 8 9	2.10c	700	1.47c	700	2.34c	127
Sheets, black	2.31c	10 10 0§	2.55c	850‡	1.63c	775‡	2.65c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.86c	13 0 0	4.50c	1,500	3.15c	1,500	6.81c	370
Plain wire	2.04c	9 5 0	3.39c	1,130	2.31c	1,100	3.18c	173
Bands and strips	2.06c	9 7 0	1.95c	650	1.47c	700	2.34c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b Since January.
**Gold pound sterling carries a premium of 69.70 per cent over paper sterling.

Bars

Bar Prices, Page 64

Pittsburgh — Several ordinarily large consumers of merchant bars have not yet made fourth quarter commitments. This policy is attributed to unsettlement over prices and commercial features in the market. This quiet condition has affected both carbon and alloy steel bars alike, although base prices are officially unchanged at 1.80c, Pittsburgh for carbon bars, and 2.45c, Pittsburgh for alloy bars.

Cleveland—Road machinery builders placed the largest orders for steel bars here during the week, followed by manufacturers of tubing. Agricultural implement manufacturers purchased some small lots. Little has developed from the automobile industry, producers now believing that substantial tonnages will not be purchased until late this month or November.

Chicago—Bars continue relatively more active than other heavy rolled steel products, demand recently having been aided by further small gains in orders from automotive and farm implement builders. Sales of farm equipment so far this year have shown a substantial increase compared with 1932 and 1933. Heavier demand from the automotive industry is anticipated late this month and November.

Boston—Commercial steel bars are less active and demand for forging and alloy bars is also light. Slow operating schedules of industrial consumers have curtailed demand. Most larger machinery builders are inactive, notably shops making heavier textile and paper mill equipment.

Philadelphia — Commercial steel bar tonnage appears about on a parity with a week ago, with prices unchanged at 1.80c, Pittsburgh, or 2.09c, Philadelphia. Opening of bids on 178 tons of galvanized bars and bands for the navy has been postponed from Oct. 12 until Nov. 2.

Tin Plate

Tin Plate Prices, Page 64

Pittsburgh—Tin plate mill operations have declined 10 points to 40 per cent. Canmakers now are using up stocks instead of making new commitments to reduce inventories by the end of the year. The tomato pack this year is estimated at 13,000,000 to 14,000,000 cases, and while this will not surpass the record of some 16,000,000 cases, it will be as good a showing as made in recent years. The market is steady at $5.25 per base box, and tin mill sizes of black sheets are 2.75c, base Pittsburgh.

Plates

Plate Prices, Page 64

Philadelphia—Opening of bids on 3540 tons of plates and sheets, black and galvanized, for the navy, has been postponed from Oct. 12 to Nov. 2. This represents initial requirements for ships recently let to the navy's own yards. The material is for Puget Sound, Norfolk, Boston and Mare Island. Meanwhile, orders are also being held up on more than 1000 tons of plates on which bids were opened by the navy more than a month ago. Railroad work is proving disappointing to sellers, although early action may be taken by the Pennsylvania in the award of 78 electric locomotives for which a modest tonnage of plates will be required, a far smaller tonnage than if the locomotives were to be operated by steam.

Pittsburgh—Low bidders on 500 tons for ten pontoons and 600 feet of discharge pipe for the St. Louis engineers were announced late last week. Ingalls Iron Works Co., Birmingham, Ala., is low on the pontoons and pipe line trucks at $27,670, among 15 bidders, many in the Pittsburgh district. This contract requires 300 tons of plates. The other contract for 200 tons and 600 feet of 24-inch discharge pipe finds Treadwell Construction Co., Midland, Pa., low at $6840. Last week, American Bridge Co., closed on a work hull for the Ohio River Co., Cincinnati, requiring about 150 tons. This inquiry had been pending for several months. No award has been made by the Semet-Solvay Corp., Syracuse, N. Y., on a mooring barge for Baton Rouge, La., and it appears probable that a concrete type unit may be purchased.

Cleveland—Standard Oil Co. of Ohio, Cleveland, has taken bids and is expected to award shortly eight fractionating tanks and towers, requiring approximately 450 tons of shapes and plates. Railroads are buying little material and miscellaneous tank work is light. The Cleveland plate mills, idle last week, have a schedule for this week.

Chicago—Plate orders are principally for miscellaneous uses, with no large individual lots. Railroads and freight car builders are taking little tonnage, due to completion of equipment building and repair programs. Moderate plate tonnages are involved in pending and prospective construction work, principally of a public nature.

Boston — Plate demand has declined slightly, most being small miscellaneous orders, generally for early delivery. Such orders are fairly numerous, but the aggregate tonnage is not impressive. McClintic Marshall Corp., Bethlehem, Pa., is low on three standpipes at Lowell, Mass., $41,890. Plates are steady at 2.20c, Boston.

New York—Following the recent placing here of sizable tonnage by two private yards for navy construction, 260 tons of plates have been reported as required for repairs to a tanker for the Socony-Vacuum Oil Co., the work to be done by the Federal Shipbuilding & Dry Dock Co., in this district. Major pending inquiry consists of oil refinery and storage tank tonnage.

Contracts Placed

150 tons, work barge for Ohio River Co., Cincinnati, to American Bridge Co., Pittsburgh.

100 tons, 110 dump cars, specification 1504, Los Angeles, to unnamed interest.

100 tons, cracking plant, Kellogg Co., Richmond, Calif., to Moore Drydock Co., Oakland, Calif.

100 tons, two anchor barges, United States engineers office, Portland, Oreg., to Commercial Iron Works, Portland, Oreg.

Contracts Pending

558 tons to 4100 tons, aqueduct, metropolitan water district, Los Angeles; bids Oct. 31.

450 tons, including small lot of shapes, eight fractionating tanks and towers, Standard Oil Co. of Ohio, Cleveland.

300 tons, 10 steel pontoons and 10 pipe line trucks, for St. Louis army engineers; Ingalls Iron Works Co., Birmingham, Ala., low at $27,670 for both pontoons and trucks, with delivery in 55 days.

200 tons, 600 feet of 24-inch discharge pipe, St. Louis army engineers; Treadwell Construction Co., Midland, Pa., low at $6840 for 20-day delivery.

100 tons, two boilers for state of Arizona; bids opened.

Unstated tonnage, three standpipes, 1,000,000-gallon, 600,000-gallon and 400,000-gallon, Lowell, Mass., McClintic-Marshall Corp., Bethlehem, Pa., low.

Sheets

Sheet Prices, Page 64

Pittsburgh—Sheet specifications have fallen to a rate below the present 21 per cent operating average for the industry, and unless improvement is noted within the next week to ten days, production will be reduced. Tonnage buying for 1935 automobiles is

expected in few weeks. Sheet prices are unchanged.

Cleveland—Demand still is slow, and producers feel uncertainty respecting the government's code and price policies is retarding business. Sheet mills in Cleveland and in an adjacent lake district serving the Michigan automobile manufacturers lacked sufficient specifications to operate last week, though some production may be scheduled this week.

Chicago—While still relatively light, sheet buying was slightly heavier the past week and a further upturn in demand and production is anticipated for the near future. Automotive orders are expanding gradually. Galvanized roofing material continues in poor demand in most agricultural districts.

Boston—Orders for sheets for early delivery are fairly numerous. Small tank demand has been disappointing in some quarters and there has been a considerable shift in fabricating of these units, a Fall River, Mass., shop having taken a good share. One mill which in the past supplied considerable blue annealed, Nos. 14 and 16 gages, has turned down such business as unprofitable.

New York—Current sheet demand reflects increasingly reduced stocks at consumers' plant, as well as uncertainty with regard to future prices. Orders are of rush character, and are generally small. Actual fabrication of sheets at manufacturing plants is well sustained, according to trade surveys.

Philadelphia—Sheet demand is being fairly well sustained, although still spotty. Pennsylvania has closed on 250 tons of No. 25 gage automobile license tag stock with the American Sheet & Tin Plate Co., for shipment during the fourth quarter. The metal will be fabricated at a penitentiary in western Pennsylvania.

Cincinnati—Demand for sheets tapered during the past two weeks to a level about 20 per cent under the peak for the third quarter. Tonnage business for new automobile models has not yet developed. Specifications from household specialty manufacturers and for galvanized sheets are fairly steady.

St. Louis—Manufacturers and distributors of steel sheets report tonnage so far in October ahead of September and also August. Demand from miscellaneous sources has broadened.

Cold Finished

Cold Finished Prices, Page 65

Pittsburgh — Fair improvement continues in cold-finished steel bars in both specifications and shipments. Some preliminary buying for 1935 automobiles continues, and a leading Detroit maker entered his initial cap screw specification the past week. The market is steady at 2.10c, base, Pittsburgh, for carbon cold-drawn bars. Alloy bars are likewise steady at 2.95c, base, Pittsburgh.

Railroads

Track Material Prices, Page 65

Practical completion of carbuilding and repair programs under government sponsorship has cut off demand for steel for this purpose and railroads and equipment manufacturers are out of the market. Rail mills have completed rolling of rails bought under government aid and are idle except for occasional small lots.

Railroads, through a vote conducted by the mechanical division of the American Railway association, have decided to re-equip about 2,000,000 old freight cars with a type of brake which has been standard equipment on all new cars for two years. The program, to be started immediately, will cover a 10-year period and it is estimated will cost $29,000,000 a year. In each of the ten years, it is planned to service about 200,000 old cars with these brakes at a cost of $145 a pair. Large tonnages of castings and various rolled steel products will be required.

Early action may be taken by the Pennsylvania in the award of 58 electric locomotives, the precise types yet to be decided.

Standard Tank Car Co., Sharon, Pa., has taken an order from a refining company for 75 tank cars and from another for 40 tanks for installation on cars.

Car Orders Placed

Unidentified refining company, 75 tank cars and 40 separate tanks, to Standard Tank Car Co., Sharon, Pa.

Pipe

Pipe Prices, Page 65

Pittsburgh—Jobbers' pipe specifications in the standard grades appear slightly heavier as a result of some buying for heating and sanitary improvements in residential homes, following upon Home Owners' Loan Corp. advances. The movement is not as yet of distinct benefit to pipe producers but should gain headway within the next few months as jobber stocks become more depleted. Buying of mechanical tubing, boiler tubes and welded pipe is fairly well sustained.

Chicago—About 1000 tons of cast iron pipe is involved in several orders placed in this and nearby states recently the largest being 400 tons for Seymour, Wis. One of the larger inquiries pending calls for 800 tons for Benda, Ill. While pending work is being closed steadily, there has been little acceleration in proposed construction by a large number of small municipalities in the Middle West. Delays have developed both at Washington and among local officials in speeding up the work and the volume of orders placed so far this year has fallen considerably below previous estimates.

Boston—Cast pipe buying is more active, recent awards including approximately 1500 tons. The New England foundry took 700 tons for Barnstable, Mass. Providence, R. I., also bought 550 tons.

Birmingham, Ala.—Expected pipe business is developing slowly. No stock of raw material of any consequence is being carried and no apprehension is felt of delay when iron, scrap or coke is needed.

Cast Pipe Placed

877 tons, 4 to 14-inch, class 150, Brawley, Calif., to unnamed interest; general contract to Marko Matick, Los Angeles.

476 tons, 6-inch, class 150, Williams, Ariz., to unnamed interest; general contract to O. F. Fisher, Los Angeles.

420 tons, 4 to 12-inch, class 150, Big Timber, Mont., to unnamed interest; general contract to Threet Bros. Construction Co., Lovell, Wyo.

400 tons, 12-inch and smaller, Bridger, Mont., to unnamed interest; general contract to Lease & Leighland, Great Falls, Mont.

400 tons, Seymour, Wis., to James B. Clow & Sons, Chicago.

200 tons, Mitchell, S. Dak., to James B. Clow & Sons, Chicago.

200 tons, McLain, Ill., to James B. Clow & Sons, Chicago.

150 tons, Mt. Sterling, Ill., to James B. Clow & Son, Chicago.

Unstated tonnage, waterworks improvements, Frederic, Wis., to James B. Clow & Sons, Chicago.

Cast Pipe Pending

800 tons, Benda, Ill.

700 tons, 6 to 12-inch, Barnstable, Mass., to Warren Foundry & Pipe Co., Chelsea, Mass.

653 tons, 4 to 8-inch, class 150, east bay municipal utility district; Oakland, Calif.; bids opened.

550 tons, Providence, R. I., to United States Pipe & Foundry Co., Burlington, N. J.

200 tons, Centerville, Mich.

200 tons, 12-inch, Onset, Mass., to R. D. Wood & Co., Florence, N. J.

130 tons, small sizes, Natick, Mass.; bids Oct. 12.

Unstated tonnage, 2221 feet of 8-inch and 1255 feet of 16-inch, Milwaukee; bids Oct. 16.

Wire

Wire Prices, Page 65

Pittsburgh—Some improvement in forward buying of manufacturers' wire is noted, buyers directly allied with the automotive industry being most prominent. No appreciable gains are noted in merchant wire product demand and jobbers generally are buying in small volume. Plain manufacturers' wire continues 2.30c, Pittsburgh, with wire nails $2.60 per keg.

Cleveland—Some consumers of wire and wire products who have deferred commitments in anticipation of price revisions have found it necessary to make some purchases to carry on manufacturing operations. These orders have been coming through in dribbles, but recently have increased in size. One user, who several weeks ago admittedly was waiting for a price concession, placed two carloads of nails. Demand from agricultural districts is not developing as well as expected. Nut and bolt manufacturers are marking time until they obtain specifications from automobile builders.

Chicago—Wire sales and specifications usually are for small lots and the trend in general business is fairly level. Little betterment in demand is anticipated during October although heavier buying for new automobile models is expected soon. Changes in needs of miscellaneous consumers of manufacturers' wire are small and activity in wire products is unchanged.

Boston—Improvement in demand for wire is slow, but most producers note a gradual gain. Orders are usually for small lots for immediate requirements. Plain bright wire is unchanged at 2.40c, Worcester, Mass.

Philadelphia—Demand for wire products is little short of stagnant. Seasonal building repairs fail to make appreciable increase in nail specifications, and manufacturers are buying in limited quantities. One eastern producer is reducing operations, due in part to seasonal decline in demand for fencing.

Strip Steel

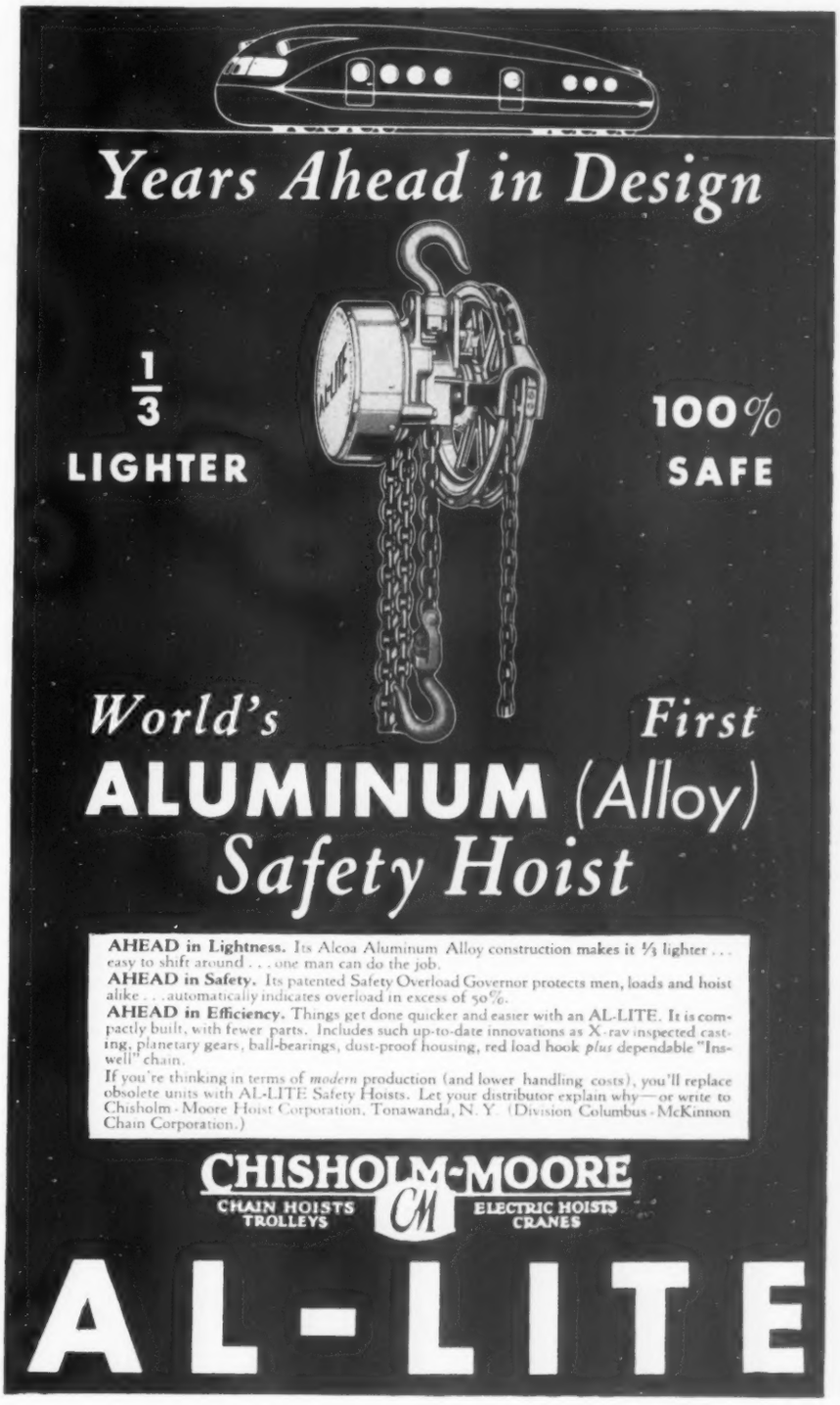
Strip Prices, Page 65

Pittsburgh—Hot and cold-rolled strip steel buying from automotive sources promises larger tonnage but demand from hardware makers, and manufacturers of cash registers and small stampings shows no improvement. The cold strip market is steady at 2.60c, base Pittsburgh or Cleveland. Hot rolled strip steel is unchanged at 1.85c, Pittsburgh.

Cleveland—Specifications from automobile manufacturers show a slight improvement. Some General Motors units last week released material in lots up to 200 tons, for new models. Chrysler Corp. placed an order for 2,000,000 hub caps with the Moto-Meter Gauge & Equipment Corp., subsidiary of Electric Auto-Lite Co., Toledo, O. Chrysler has been using both steel and brass for hub caps, and it is expected that more than 100 tons of strip steel will be required in this order.

Boston—Cold-rolled strip operations are slightly improved, with some gain in small orders for narrow widths. Hot strip demand is quiet and total volume in both cold and hot strip changed little during the week.

Chicago—Except for slight improvement in automotive strip or-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1/3 LIGHTER
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AHEAD in Safety. Its patented Safety Overload Governor protects men, loads and hoist alike . . . automatically indicates overload in excess of 50%.
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If you're thinking in terms of modern production (and lower handling costs), you'll replace obsolete units with AL-LITE Safety Hoists. Let your distributor explain why—or write to Chisholm-Moore Hoist Corporation, Tonawanda, N. Y. (Division Columbus-McKinnon Chain Corporation.)
CHISHOLM-MOORE
CHAIN HOISTS TROLLEYS
CM
ELECTRIC HOISTS CRANES
AL-LITE

ders, the market shows little change. Motor car builders and partsmakers so far have placed only small orders for new models. Miscellaneous users show little change in consumption or purchasing, with orders usually limited to early needs.

New York—Strip sellers report that manufacturers of electrical devices and toys are now in fairly good position for the holiday trade, with a number carrying over substantial stocks of finished products from the end of last year. This, combined with other factors, is making for light demand for strip. Prices are unchanged, at 2.18c, New York, for hot strip, and 2.93c for cold strip.

Philadelphia—Strip buying continues on a hand-to-mouth basis, with orders a little more numerous, but with little change in volume. The average purchase appears lighter, consumers still moving cautiously in many cases on the assumption that lower prices may develop. Meanwhile, hot strip holds at 1.85c, Pittsburgh, or 2.14c, Philadelphia, and cold strip at 2.60c and 2.89c.

"OUR 11 CRANES HAVE GIVEN EXCELLENT RESULTS"

Sixty-tons capacity Industrial Brownhoist erection crane owned by Brann & Stuart Co.

BRANN AND STUART, well known engineers and contractors of Philadelphia, say of their Industrial Brownhoists:

"We have in our service six locomotive and five crawler Industrial Brownhoist cranes. The locomotive cranes vary in capacity from fifteen to sixty tons. The first was purchased in 1912 and is still going strong. In that time (22 years) it has probably had more active service than any other of our cranes, due to its quick action and flexibility in handling light loads and further usefulness in shifting cars.

"All of these cranes have given excellent results with comparatively small outlay for repairs. We think the fact that we have no others in our business would indicate their satisfactory performance."

Would you like to know what a locomotive or crawler crane would do for you on *your* work? A call or letter to our nearest office will provide the answer, and without obligation.

INDUSTRIAL BROWNHOIST CORPORATION
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INDUSTRIAL BROWNHOIST

Shapes

Structural Shape Prices, Page 64

Pittsburgh — New structural inquiry is limited, the largest being for 2550 tons for a toll bridge in Missouri. Plans are expected out in the week of Oct. 22 for the Gallipolis, O., dam and foot bridge, which will take about 2100 tons, including 28,500 square feet of steel sheet piling. Plain shapes are 1.80c, Pittsburgh.

Cleveland—Plans for the Lorain avenue bridge over Rocky river, Cuyahoga county (Cleveland) are expected from the state highway department late this month, requiring 2000 to 3000 tons of shapes. The highway department is taking bids Oct. 19 and 20 on several state bridges, collectively requiring 260 tons. Standard Oil Co. of Ohio, Cleveland, is taking bids on 125 tons for a dock wall in the Cuyahoga river, Cleveland. More small private jobs are being figured.

Chicago—Structural awards total about 5500 tons. Private projects are more numerous, including 800 tons for a foundry building here and 200 tons for a tractor storage building at Waterloo, Iowa. American Bridge Co. and Illinois Steel Co. will be awarded structural material and piling for the Trempealeau, Wis., dam on the placing of the general contract. Awards to low bidders on the 600-ton Lincoln avenue bridge here and the 515-ton bridge at Prophetstown, Ill., announced recently, are expected to be made shortly. Inquiries are headed by 2500 tons for a bridge at Camden, Mo.

Boston — Structural steel awards in smaller tonnages are more numerous, including bridge and public work needs. Postponed bids on the

Shape Awards Compared

	Tons
Week ended Oct. 13	15,481
Week ended Oct. 6	19,984
Week ended Sept. 29	14,044
This week in 1933	15,486
Weekly average, 1933	9,296
Weekly average, 1934	16,693
Weekly average, September	12,154
Total to date, 1933	600,053
Total to date, 1934	701,106

Boston parcel post superstructure go in Oct. 16, requiring 9000 tons.

Philadelphia—Bids will be opened Oct. 31 for construction of an aircraft factory here for the bureau of yards and docks, requiring at least 1000 tons of shapes. This, with the 2000 tons of structurals for the Delaware river bridge commission, noted in a previous issue, is outstanding. Meanwhile, 960 tons for three jobs, have been placed.

Birmingham, Ala.—New business is lagging, although backlogs call for fairly steady operations. Bids are out on considerable tonnage.

Shape Contracts Placed

2800 tons, factory buildings, Krebs Pigment & Color Co., Edgemoor, Del., subsidiary of E. I. du Pont de Nemours Inc., Wilmington, Del., to American Bridge Co., Pittsburgh; this was reported in last week's issue as going to an unnamed fabricator.

2200 tons, bridge, Sacramento, Calif., to Consolidated Steel Corp., Los Angeles.

1250 tons, state highway bridges, various locations, Iowa; 1000 tons to McClintic-Marshall Corp., Bethlehem, Pa., and 250 tons to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

870 tons, city viaduct, Nashville, Tenn., to Nashville Bridge Co.

800 tons, foundry building, Griffin Wheel Co., Chicago, to Mississippi Valley Structural Steel Co., Decatur, Ill.

780 tons, Hibbing memorial building, Hibbing, Minn., to American Bridge Co., Pittsburgh.

680 tons, pier, Coco Solo, C. Z., to unnamed interest.

550 tons, state highway bridge, Golden Rang, Maryland, to American Bridge Co., Pittsburgh.

454 tons, state bridges in Yellowstone and Silver Bow counties, Montana, to unnamed interest.

425 tons, Wisconsin state bridges to Worden-Allen Co., Milwaukee.

400 tons, lumber shed, Philadelphia Terminal Co., Philadelphia, to Truscon Steel Co., Youngstown, O.

380 tons, state bridge, Lackawanna county, Pennsylvania, awarded through Sweeney Bros., Scranton, Pa., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, bridge repairs, Northern avenue, Boston, to Lehigh Structural Steel Co., Allentown, Pa.

300 tons, state highway bridge, Nebraska, to Omaha Steel Works, Omaha.

275 tons, state crossing in Eagle county, Colorado, to unnamed interest.

270 tons, state highway bridge, Dotsero, Colo., to Midwest Steel & Iron Works, Denver.

260 tons, medical building, University of Louisville, Louisville, Ky., to Jones & Laughlin Steel Corp., Pittsburgh.

250 tons, piling, Morton Salt Co., Port Huron, Mich., to unnamed fabricator.

250 tons, building for Lincoln Electric Co., Cleveland to Austin Co., Cleveland; 75 tons of concrete bars to Truscon Steel Co., Youngstown, O.

235 tons, sewage disposal plant, Fargo, N. Dak., to Minneapolis-Moline Power Implement Co., Minneapolis.

225 tons, bridge, Colfax, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

225 tons, bridge, Thompsan Falls, Mont., to Virginia Bridge & Iron Co., Roanoke, Va.

225 tons, bridge, Menominee, Wis., to Minneapolis-Moline Power Implement Co., Minneapolis.

210 tons, state highway bridge, R. C.-3552, Cattaraugus and Erie counties, New York, to Ernst Iron Works, Buffalo.

200 tons, tractor storage building, John Deere Tractor Co., Waterloo, Iowa, to Gage Structural Steel Co., Chicago.

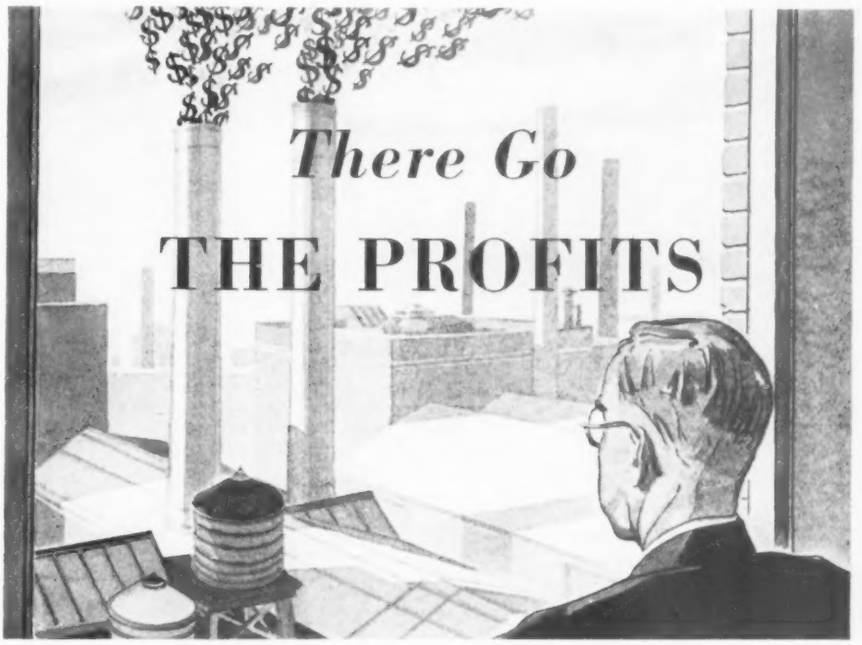
200 tons, high school, Milton, Mass., to New England Structural Steel Co., Boston.

190 tons, bridge over Silver lake, Dewitt, Iowa, for Chicago North Western railroad, to Clinton Bridge Works, Clinton, Iowa.

190 tons, furnace building for Youngstown Sheet & Tube Co., Youngstown, O., to Whitehead & Kales Co., Detroit, through Surface Combustion Co., Toledo, O.

185 tons, Stanton street substation, subway, New York, to Belmont Iron Works, Philadelphia.

180 tons, Scott Paper Co., Chester, Pa., awarded through Stone & Webster Co., Philadelphia, to Belmont Iron Works.



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Sturtevant has been successfully dealing with this problem for over 30 years. It has developed equipment which *traps* much of the heat which ordinarily flies up the stack . . . and puts it to work preheating the boiler feed water or combustion air. Fuel consumption is cut materially as a result.

One textile mill saves over $10,000 annually through use of this equipment. A paper manufacturer reports a saving of $6,623.65 a year. A large power company has slashed its coal bill 14%. Other companies, too numerous to list, have enjoyed similar economies.

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Sturtevant *Fuel Savers*

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that city; some reinforcing bars are also to be placed.

175 tons, building, Chrysler Motor Co., Detroit, to Whitehead & Kales, Detroit.

170 tons, state highway bridge, Lincoln, Nebr., to St. Joseph Structural Steel Co., St. Joseph, Mo.

160 tons, I-beam spans, Harr-Shelby counties, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

150 tons, bridge, Lincoln, Nebr., to St. Joseph Structural Steel Co., St. Joseph, Mo.

147 tons, bridge, Baltimore & Ohio railroad, Edison street, Baltimore, to Shippers Car Line Inc., Milton, Pa.; Frank Carozza & Sons Inc., Baltimore, general contractor.

145 tons, including 90 tons of sheet piling, state highway work in Los Angeles county, California, to unnamed interest.

140 tons, bridge spans, Ringgold county, Iowa, to Illinois Steel Bridge Co., Jacksonville, Ill.

130 tons, building, Soldiers' home, Chelsea, Mass., to New England Structural Co., Everett, Mass.; John Bowen Co., Boston, general contractor.

125 tons, bridge spans, Butler county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

120 tons, school, South San Francisco, Calif., to Golden Gate Iron Works, San Francisco, Calif.

115 tons, state bridge 5406, St. Louis county, Minnesota, to American Bridge Co., Pittsburgh.

105 tons, shapes and bars, auditorium, Spring Road State hospital, Catonsville, Md., to Acme Engineering Co., Baltimore, and Maryland Steel Products Co., Baltimore; Cogswell Construction Co., general contractor.

100 tons, alterations to Woodrow Wilson school, Long Beach, Calif., to Pacific Iron & Steel Co., Los Angeles.

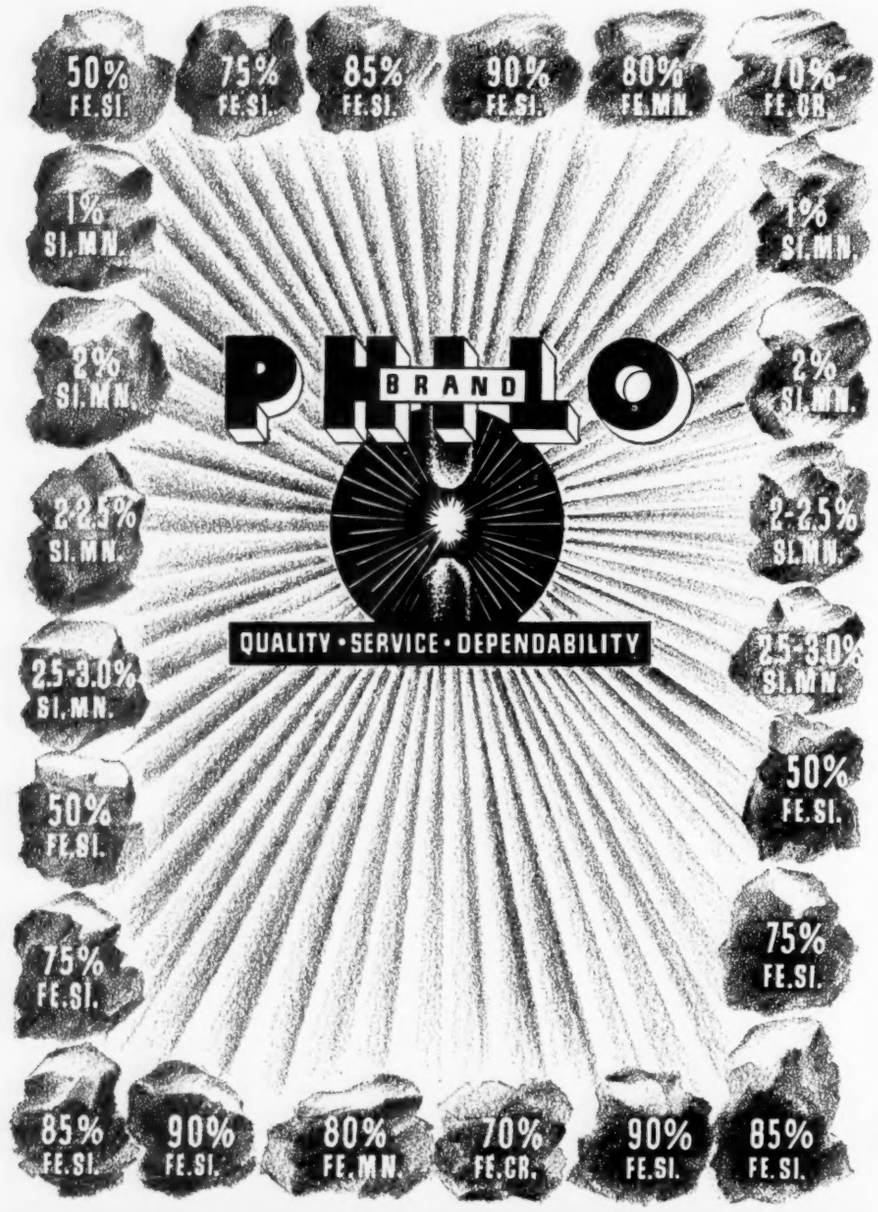
100 tons, school, Norwalk, Calif., to Virginia Bridge & Iron Co., Roanoke, Va.

100 tons, 400-foot radio tower, Western Broadcast Co., Los Angeles, to Pacific Coast Steel Corp., San Francisco.

100 tons, mine tipple, Harrisburg, Pa., to Link-Belt Co., Chicago.

100 tons, Waybridge, Vt., to McClintic-Marshall Corp.; Bethlehem, Pa.

100 tons, bridge, Haven, Vt., to Lackawanna Steel Construction Corp., Buffalo.



Ohio Ferro-Alloys Corporation
Canton, Ohio

Shape Contracts Pending

2500 tons, bridge, Camden, Mo.

2550 tons, toll bridge over Lake of the Ozarks, Versailles, Mo.

2500 tons, approximately, government bridge, over Columbia river, Grand Coulee, Washington; specifications being issued.

2100 tons, including 28,500 square feet of steel sheet piling, Gallipolis, O., dam and foot bridge; bids to be received by Huntington, W. Va., army engineers about Nov. 20.

2000 to 3000 tons, Lorain avenue bridge over Rocky river, Cuyahoga county, Ohio; plans by state highway commission, Columbus, expected about Nov. 1.

1000 tons, estimated, aircraft factory for the bureau of yards and docks, for erection in Philadelphia; bids Oct. 31.

900 tons, contract No. 6, high-speed line, Delaware river bridge, Philadelphia.

800 tons, Columbia river bridge, Grand Coulee dam, Almira, Wash.

800 tons, psychopathic-cancer ward, San Francisco hospital; bids Oct. 24.

700 tons, Iowa state highway bridges.

600 tons, Lincoln avenue bridge, Niles Center, Ill.; Gage Structural Steel Co., Chicago, low.

515 tons, bridge, Prophetstown, Ill.; McClintic-Marshall Corp., Bethlehem, Pa., low.

400 tons, sheet piling, yacht harbor, Sausalito, Calif.; bids soon.

310 tons, Eau Claire river bridge, Augusta, Wis.; bids Oct. 16.

260 tons, state bridges, Ohio; bids to state highway commission, Columbus, Oct. 19 and 20.

230 to 750 tons, aqueduct, metropolitan water district, Los Angeles; bids opened.

200 tons, city viaduct, Hampton avenue, St. Louis.

186 tons, bridge, Bigsville, Ill.; Ben Hur Construction Co., St. Louis, low on general contract.

170 tons to 1055 tons, aqueduct, metropolitan water district, Los Angeles; bids Oct. 31.

140 tons, beam span, Crawford county, Wisconsin.

125 tons, dock wall, Cuyahoga river, Cleveland, for Standard Oil Co. of Ohio, Cleveland; bids being taken.

100 tons, Beverly theater, Chicago.

Unstated tonnage, estimated at several hundred tons, state bascule bridge, Nansemond river, Suffolk, Va.; bids asked.

Reinforcing

Reinforcing Bar Prices, Page 65

Pittsburgh—Numerous state highway projects in Pennsylvania and West Virginia, and considerable small postoffice work, provide the reinforcing bar market with a steady volume of specifications. Truscon Steel Co., Youngstown, O., has been awarded 1000 tons of new billet bars, mesh and steel sash for the Chevrolet Motor Co. plant at Baltimore, through Consolidated Engineering Co., Baltimore. On a Pittsburgh base, new billet bars are steady at 2.05c to the ultimate consumer.

Chicago—Concrete bar inquiries are light but orders and shipments recently have held closely to the average of previous weeks. Illinois road work will be productive of additional bar business as a fairly large portion of the 1934 program remains to be completed over the next several months. Orders are principally for public construction, and include 375 tons for Chicago sanitary district work and 370 tons for a bridge substructure here.

Cleveland — For the first time in two years the city of Cleveland has opened bids on road work, two jobs requiring about a carload of wire mesh. Some small state projects are being figured. Private work is lacking.

Boston—A fairly large volume of reinforcing bars is active. Small-lot inquiry holds, notably for bridges. Industrial buildings A and D, state prison colony, Norfolk, Mass., will require 480 tons.

Philadelphia—Close to 900 tons are pending for Pennsylvania state road work and 1000 tons for two other projects, including about 700 being for a paint factory in Edgemoor, Del. Current buying is featured by the award of 287 tons for the department of internal revenue building in Washington, through a Philadelphia contractor. The market is unchanged at 2.05c, Pittsburgh, for billet bars in cut lengths, or 2.34c, Philadelphia.

Birmingham, Ala.—River dam and road work calls for moderate tonnages of reinforcing bars. One firm reports business during past three months better than for a long time.

Reinforcing Steel Awards

1000 tons, department of parks, New York city, to Carroll-McCreary & Co. Inc., Brooklyn, N. Y.

1000 tons, mesh, sash, and new billet steel bars, Chevrolet Motor Co., assembly plant, Baltimore, to Truscon Steel Co., Youngstown, O., through Consolidated Engineering Co., Baltimore.

480 tons, industrial buildings A and D, prison colony, Norfolk, Mass., to unstated fabricator; M. Spunelli & Sons, Boston, general contractor.

375 tons, Chicago sanitary district, to Truscon Steel Co., Youngstown, O.

370 tons, Ashland avenue bridge substructure, Chicago, to Truscon Steel Co., Youngstown, O.

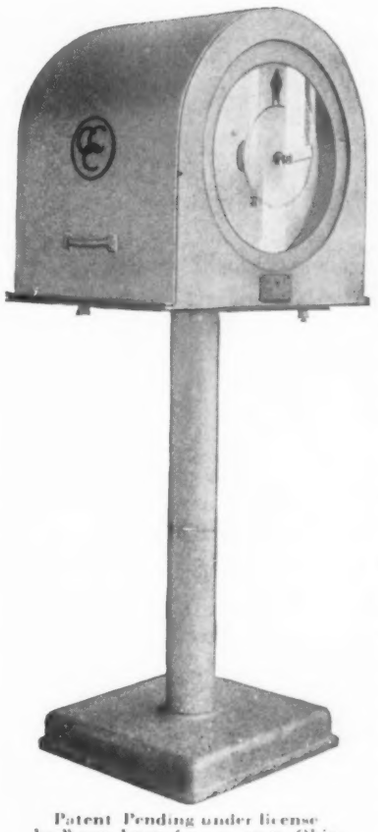
287 tons, building work for department of internal revenue, Washington,

Concrete Awards Compared

	Tons
Week ended Oct. 13	4,749
Week ended Oct. 6	2,409
Week ended Sept. 29	2,162
This week in 1933	6,965
Weekly average for 1933	3,232
Weekly average, 1934	4,387
Weekly average, September	2,604
Total to date, 1933	151,716
Total to date, 1934	194,273

CLARK

AUTOMATIC SHEET MEASURING DEVICE



Patent Pending under license by Wean Engr. Co., Warren, Ohio

For use in any sheet or tin mill using automatic roller and catching tables and can be applied to existing installations without modification of such installations.

After the sheet passes through rolls it automatically gives an accurate indication of length of sheet by movement of pointer on an illuminated dial which may be calibrated to read directly in inches. Position of pointer is maintained while the sheet is taken back over top of rolls and until it starts through the next pass giving operator ample time to note definitely the length and set his rolls accordingly.

During next pass pointer moves from previous position to new position again indicating length of sheet after the latest pass. This operation is repeated until required length of sheet is obtained. The next piece as delivered from furnace automatically resets the pointer to indicate lengths, making it possible for the operator to know definitely the length of the sheet after each pass.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
Cleveland, Ohio

awarded through John McShain, Philadelphia, general contractor, to the American Steel Engineering Co., Philadelphia.

275 tons, Postum Co., Battle Creek, Mich., to Concrete Engineering Co., Chicago.

178 tons, state highway work in Pueblo and Eagle counties, Colorado, to unnamed interests.

150 tons, alterations to Woodrow Wilson high school, Long Beach, Calif., to unnamed interests.

125 tons, warehouse for Graybar Electric Co., Los Angeles, to unnamed interest.

100 tons, Krebs Pigment & Color Co., Edgemoor, Del., reported placed with two sellers, with possibly 700 tons additional expected to be awarded shortly.

100 tons, repair of David Starr Jordan school, Long Beach, Calif., to unnamed interest.

100 tons, repair to school, 715 Locust avenue, Long Beach, Calif., to unnamed interest.

100 tons, repair of Lincoln school, Pasadena, Calif., to unnamed interest.

100 tons, repair of Madison school, Pasadena, Calif., to unnamed interest.

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DETROIT

Reinforcing Steel Pending

45,000 tons, for aqueduct bid No. 70, Los Angeles; bids opened; 19,500 tons of tons of billet steel bars and 25,500 tons railsteel bars to be furnished by metropolitan water district.

10,500 tons, billet steel bars, aqueduct bid No. 75, Los Angeles; bids Oct. 31.

600 tons, miscellaneous state road work, Pennsylvania; bids Oct. 19 and 26.

311 tons, dam, Trempealeau, Wis.; Paper, Calmenson & Co., St. Paul, low.

300 tons, tunnel for Maiden Creek Water Co., Reading, Pa.; bids Oct. 17.

170 tons, printing building, San Francisco; general contract to Cahill Bros., San Francisco.

170 tons, Vasona dam, San Jose, Calif., for Santa Clara county; Car & Swenson, San Francisco, general contract.

100 tons, toll bridge, over Lake of the Ozarks, Versailles, Mo.

100 tons, approximately, Scott Paper Co., mill addition, Chester, Pa., pending.

Iron Ore

Iron Ore Prices, Page 66

Cleveland—Receipts of Lake Superior iron ore at Lake Erie ports in September amounted to 2,343,438 tons, according to the Lake Superior Iron Ore association. Receipts in the same month last year were 4,205,493 tons. Shipments from Lake Erie docks to interior furnaces totaled 1,414,050 tons; last year in September, 3,026,193 tons. Receipts and shipments for the season to Oct. 1, and dock balances follow:

	Receipts	Shipments	Dock bal. Oct. 1, '34
Buffalo	1,336,309	5,442	2,153
Erie	785,382	793,363	121,163
Conneaut	2,778,114	2,815,137	1,821,757
Ashtabula	1,614,609	1,456,756	1,660,219
Fairport	678,722	683,905	387,402
Cleveland	3,440,200	2,259,844	806,985
Lorain	1,689,667	988,285	12,527
Huron	361,009	324,446	374,369
Toledo	698,627	367,330	14,250
Total	13,382,639	9,694,508	5,200,825
Year ago	11,959,224	9,095,972	5,033,573

Receipts for the season at other ports follow:

	Tons
Detroit	526,327
Indiana Harbor	1,112,342
Gary	1,352,227
South Chicago	1,754,679
Sault Ste. Marie, Ont.	62,604
Hamilton, Ont.	287,265
Total	5,095,444
Year ago	3,572,246

Quicksilver

New York—Qiucksilver prices are unchanged in a quiet market. Small lots are quoted $74.50, a virgin flask of 76 pounds, and round lots down to $73.50.

Pig Iron

Pig Iron Prices, Page 66

Pittsburgh—A large potential demand for pig iron is expected to develop following the program adopted last week by leading railroads to re-equip approximately 2,000,000 freight carriers with a new type of airbrake. The re-equipment will begin immediately and cover a 10-year period with about 200,000 cars being serviced yearly. In the meantime, the merchant pig iron market is made up of small lots only and prices at the local base continue $18 for basic, $18.50 for foundry, and $19 for bessemer pig iron. Ingot mold buying last week touched a new 1934 low.

Cleveland—Business is moving in the right direction, though tonnage still is relatively light. Shipments by lake merchant furnace interests for the first ten days this month were 140 per cent larger than in the comparable period last month. Foundry coke shipments were up 33 per cent. Practically all pig iron sales are for prompt shipment, generally for carload lots, though one melter closed during the week for 500 tons.

Chicago—Pig iron activity shows additional gains, with new business and shipments moderately heavier than a month ago. Foundry operations are increasing in most directions, automotive plants being an exception. The latter are scheduled to resume work shortly in connection with new models and this will result in a more substantial upturn in foundry operations. The market continues $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron buying continues sluggish. Foundry melt has not increased, with the possible exception of stove plants. Textile equipment and machinery builders are generally operating on lighter schedules.

New York—While there apparently has been little change in volume, such orders as are coming out are of increasing urgency, indicating that some stocks laid in last June have been consumed. Prices are steady.

Philadelphia—Pig iron specifications are far below normal, but are trending upward. The melt in most cases is a little heavier. Consumers' stocks are steadily being depleted, resulting in more releases. Prices are unchanged.

Cincinnati—Pig iron sellers continue to face an inactive market. Automobile and jobbing foundries are at a low level of production; stove foundries present the brightest element in the district. Furnaces at Hamilton and Columbus remain in blast, piling part of the output.

St. Louis—Improvement in pig iron buying since the first of this month has been noticeable, with a marked betterment in sales and shipments.

Most of the improvement is accounted for by stove foundries, implement manufacturers and makers of household appliances. Jobbing plants report the booking of a substantial tonnage of orders from miscellaneous sources, with the outlook for the next month or six weeks promising. Shipments so far this month are considerably in excess of the corresponding period in September.

Birmingham, Ala.—No change is noted in pig iron market, consumers buying only against immediate needs. Production continues ahead of consumption. Alabama has produced 989,975 tons of iron during the first nine months of year as against 900,-

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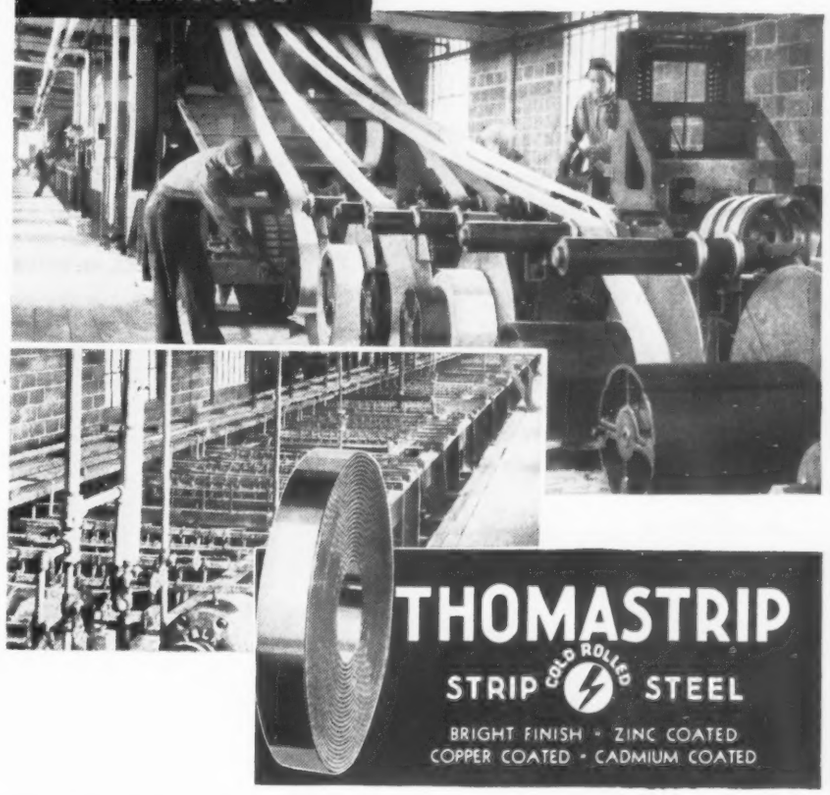

170 tons for all of 1933. Estimate is made that output of blast furnaces for 1934 in Alabama will be 1,139,975 tons which will bring the average for 10 years to 2,048,480 tons a year.

Toronto, Ont.—New developments were absent from the Canadian iron and steel markets for the week, with the Thanksgiving holiday partly responsible for quiet business.

Scrap

Scrap Prices, Page 67

Pittsburgh—Slow demand dominates the scrap market with several new shipping holdups in effect. Therefore, it is surprising to note the relative steadiness of successful bids for railroad lists. Railroad heavy melting steel from the Pennsylvania was sold at close to $10.75 a ton for shipment to down-river points and to Youngstown, but springs and wheels brought just over $13 for this district, although knuckles and couplers could obtain little better than $12.50. Owing to active dealer coverage on hydraulic bundles, this grade has advanced slightly, and brokers are also willing to pay $7 for machine shop turnings. Last week, uncut structural steel was sold by a leading railroad at $8.65 a ton for nearby delivery.

Cleveland—Low rate of steel mill consumption of scrap and fairly large yard stocks hold back current buying. Cast scrap shows strength on increased foundry activity. General conditions as affecting scrap tend to quiet.

Boston—Forge flashings and machine shop turnings are up 25 cents. Most activity is in export business, several thousand tons of melting steel grades being loaded at Boston. Consumers are not inclined to increase delivered prices on heavy melting steel and shipments are light.

Philadelphia—Scrap trading appears at a virtual standstill, with shipments against orders being held up at most important consuming plants. A slight reduction in No. 1 cupola cast, to a flat $11, delivered, is the only change in a generally nominal market.

Chicago—Except for an increase in scrap demand from foundries, the market shows no important developments. Mills continue uninterested in large purchases of steelworks scrap and prices on such grades generally are unchanged. Heavy melting steel continues $8.50 to $9. Shipments against orders are light, reflecting the low rate of open-hearth operations. Cast scrap is stronger with prices 50 to 75 cents a ton above previous levels.

Cincinnati—Mills show little interest in new buying, causing dealers to be wary in recent bidding on railroad lists, the chief feature in the market currently. Prices on most grades are unsteady.

St. Louis—Dullness in steel and iron scrap continues and shipments are at a minimum. A strong undertone is evident, indicating better buying soon. Prices are resisting further decline.

Birmingham, Ala.—Prolonged quiet of the iron and steel scrap market is irksome. Deals are few and prices are weak. Heavy melting steel is still held at $8.

Toronto, Ont.—Trading in iron and steel scrap is dull and featureless. Sales are confined to special grades and orders are sharply fewer. Steel grades are dull, while there is a spotty market for iron grades. Dealers continue out of the market and prices are unchanged.

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We design and manufacture tanks lined with lead, rubber or protective wood.
Consult us regarding your tank problems.
THE HAUSER-STANDER TANK CO.
CINCINNATI, O U.S.A.
WE WIN WITH QUALITY

Warehouse

Warehouse Prices, Page 68

Pittsburgh—Price weakness continues in the warehouse steel market, especially in outlying districts served by jobbers with stocks at Pittsburgh. Recently certain price discrepancies on extras on cold-drawn bars have occurred and some jobbers are waiving extras on plates and shapes. At the same time, base prices are being shaded and against an official 2.80c base on bars and small shapes, some jobbers have recently quoted as low as 2.25c on small lots. Plates and shapes officially 3.05c have been shaded in certain instances to as low as 2.75c. Hot-rolled annealed sheets generally are 2.95c. Demand is little changed from a month ago.

Chicago—Sales from warehouse are steady and continue moderately heavier than a month ago. Jobbers anticipate a further slight betterment soon, with a seasonal decrease in November and December.

Philadelphia—Warehouse trading has been steady since the first of the month, anticipated improvement having failed to materialize. Prices are unchanged.

Detroit—Warehouse sales maintain a slight increase over the Sep-

tember rate which in turn recorded a small gain over the preceding month. Prices are unchanged.

Cincinnati — Warehouse activity has slowed moderately from the September rate, a reversal of the anticipated trend. Bolts and nuts have been revised on changes in mill prices. Other quotations are unchanged.

St. Louis—Purchasing of seasonal commodities this month has served to boost warehouse sales for the first two weeks well above that period in September.

Metallurgical Coke

Coke Prices, Page 65

Although some metallurgical coke sellers continue to quote $5.35 per ton, Connellsville, Pa. oven basis on premium foundry grades, some interests are quoting $5.10 per ton base. The market is steadier at $4.60 for common foundry grades. Furnace coke is unchanged at $3.85 for immediate shipment.

Foundry specifications for metallurgical coke at Pittsburgh do not indicate an overstocked condition. Most buying is from hand-to-mouth, and usually represents only immediate needs.

Foundry coke shipments at Chicago showed a more substantial increase the past week and for the month are considerably heavier than during the corresponding September period. This tendency reflects betterment in schedules of a large number of foundries. By-product foundry coke continues $8.50, ovens, for outside delivery and $9.25, delivered Chicago. Specifications for by-product foundry coke at Cincinnati reflect a low foundry melt. Prices are steady. Foundries in the St. Louis district are increasing their melt and shipments of coke show a corresponding gain.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 65

Buying of bolts, nuts and rivets is in light volume from most consumers. Prices of rivets are steady, but some shading on bolts and nuts continues.

At Cleveland specifications from automobile manufacturers increased during the week. Pontiac in particular released some sustantial orders. A number of purchases were made by miscellaneous users who have not bought material for a year or more.

Demand is slow in the Chicago area with most consumers taking less than had been expected. Shading of the new lower prices on bolts and nuts is said to be as general as before the reduction. Rivets are more steady.

Semifinished

Semifinished Prices, Page 65

Demand for sheet bars from the tin plate producers has declined. Forging billet users have not regained any measure of activity, and nonintegrated pipemakers who use both skelp and tube rounds have not entered new specifications. Base prices hold at $27, Pittsburgh, for billets, and $28 for sheet bars, with skelp 1.70c, and tube rounds 1.80c. Some of the screw machine shops have recently been buying slightly heavier tonnages of wire rods.

Ferroalloys

Ferroalloy Prices, Page 66

Ferromanganese specifications are heavier than a month ago, reflecting steelmaking operations. The market is unchanged at $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, is holding at $26, furnace, on quantities up to 50 tons, and $24 on lots of 50 tons and over. Spiegeleisen is moving slowly.

Nonferrous Metals

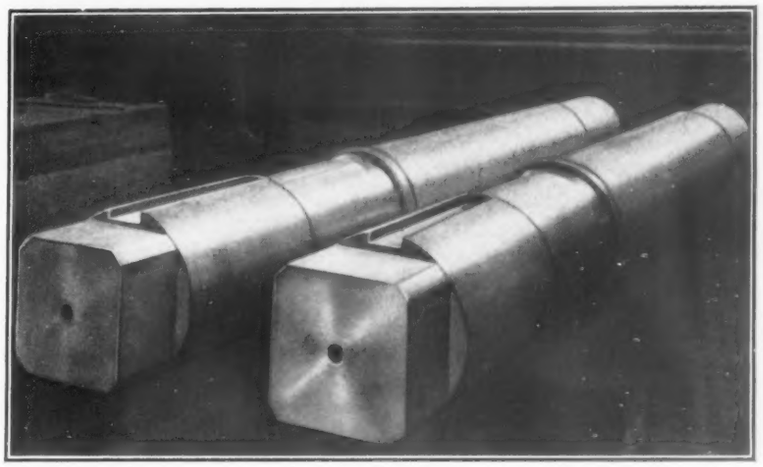
Nonferrous Metal Prices, Page 66, 67

New York—Sentiment in nonferrous metal markets improved noticeably toward the end of last week on a combination of purely market factors and the announced government policy that the general price level must be increased to aid recovery. Foreign buying of certain metals was larger.

Copper—Sales jumped to about 3525 tons for first four days compared with 1000 for entire previous week. Prices held firm on basis of 9.00c, Connecticut, and observers believe that the next price change will be upward. The industry is making adjustments to the recent decline in consumption and it is believed that no further change in the code will be made.

Zinc—Price declined Tuesday and Wednesday but held steady for the remainder of the week at 3.80c, East St. Louis. Interest centered on the probability of an increase in ore

QUALITY FORGINGS



17,000 lb. Sugar Mill Shaft

Rolled Steel Wheels — Rolled Steel Rings and Flanges
Forgings — Steel Castings — Steel Tires
Springs — Gear Blanks

STANDARD STEEL WORKS COMPANY
BURNHAM, MIFFLIN CO., PENNA.
Branch Offices
New York Philadelphia Chicago San Francisco
Akron Portland, O. St. Louis

prices due to curtailment in the Tri-State district.

Lead—A moderate pickup in sales was noted Thursday and the price tone was steady at 3.60c, New York, and 3.45c, East St. Louis. Only light tonnages have been booked for November needs.

Tin—Fairly active business was booked on rising prices Thursday after dull trading during the first part of the week. Pound sterling turned stronger against the dollar thereby lifting quotations here to 50.85c for spot Straits.

Aluminum—Trading was quiet and prices unchanged.

Antimony—Firmed up on higher prices in China and reports of European buying. Quotation at the week-end was 9.25c, duty paid, for spot.

Pacific Coast

Pacific Coast Prices, Page 65, 66, 68

San Francisco—*(By Air Mail)*—Bids have been opened by the Los Angeles metropolitan water district for two aqueducts involving 55,500 tons of reinforcing bars, 9900 tons of plates and 1800 tons of structurals. This work is expected to be awarded soon. Awards of reinforcing bars and structural shapes were the largest for any week in over a month while bookings of cast iron pipe and plates were the heaviest in over 12 weeks.

Awards of reinforcing bars aggregated more than 1300 tons and brought the total for the year to 91,063 tons, compared with 57,483 tons for the corresponding period last year. Unnamed interests secured 178 tons for highway work in Colorado and 150 tons for alterations to a school in Long Beach, Calif. The general contracts for 170 tons, each, for a printing building in San Francisco and a dam for Santa Clara county, California, have been placed.

Plate awards exceeded 5000 tons and included 100 tons for a cracking plant in Richmond, Calif., booked by Moore Drydock Co., Oakland, Calif. Pending business exceeds 13,000 tons, close to 10,000 tons being involved in two aqueducts for Los Angeles. Big Timber, Mont., has placed 300 tons of 14-inch, 12-gage sheets for a pipe line with unnamed interests. Bids open next week on over 1600 tons of plates and sheets for navy yards on the Pacific coast.

Bookings of structural shapes aggregated more than 2300 tons and brought the total for the year to 105,490 tons, compared with 214,416 tons for the same period in 1933. Among the larger lettings were 680 tons for a pier at Coco Solo, C. Z., placed with an unnamed interest, and 454 tons for highway work in Montana. New bids have been asked on 800 tons for a psychopathic ward for the general hospital in San Francisco.

Cast iron pipe awards were the largest in over 14 weeks and brought the total for the year to 33,183 tons, compared with 33,089 tons for the same period a year ago. Unnamed interests secured 877 tons for Brawley, Calif., 476 tons for Williams, Ariz., and 420 tons for Big Timber, Mont. Pending business includes 653 tons for Oakland, Calif., and 7469 tons for San Francisco.

Northwest Buying Active

Seattle—Contracts in excess of $1,000,000 were awarded this week by Mason, Walsh, Atkinson, Kier Co., general contractor for the Coulee dam. These included administration and company buildings and 360 dwellings. Anaconda Wire & Cable Co., Great Falls, Mont. will furnish cable for the 25-mile power line from Coulee to the damsite, which will be constructed by H. H. Walker Inc. and Fritz Ziebarth, Los Angeles. It will be 110,000 volt, 3-phase type supporting four cables. Ten power shovels, 3 to 5 yards, were awarded to Bucyrus-Erie Co., Milwaukee, and Marion Steam Shovel Co., Marion, O. A locomotive crane went to Browning Crane & Shovel Co., Cleveland. Feeder conveyor equipment will be furnished by Jeffrey Mfg. Co., Columbus, O., and General Motors Corp. was awarded company cars.

Demand for cast iron pipe is slow although many cities are planning improvements. John Sterhan, Glendive, Mont., is low at $19,235 for a water system in that city. West Coast Construction Co. is low bidder for a pipeline job at Longview, Wash., for the federal subsistence homestead experiment. Billings, Mont., has adopted a 5-year water system $250,000 improvement program and will install at once two filters costing $80,000.

Seattle has postponed until Oct. 15 new bids for city light powerhouse and switch platform and until Oct. 16 bids for 216 tons of angle steel for power transmission towers.

The jobbing trade is unchanged, buying confined to small tonnages. Prices are being maintained. The Japanese scrap market is off 25 to 50 cents due to weakness of the yen. No 1 scrap steel f.a.s. here is quoted at $8.50 to $8.75. Fair shipments of materials are arriving at tidewater from interior points. Steamship space is offering more freely but the rate remains $3.50. Exporters believe the lull is temporary and expect Japanese buyers to be active again shortly.

Jewell Steel & Malleable Co., Buffalo, has changed its name to Jewell Alloy & Malleable Co. Inc. to represent more closely its product. Development of its alloy metal into a wide range of grades, starting from its original heat-resisting metal, has caused the company to consolidate

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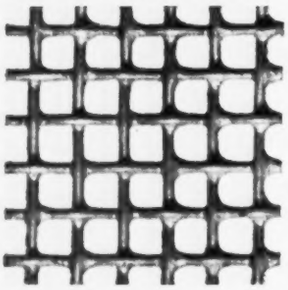

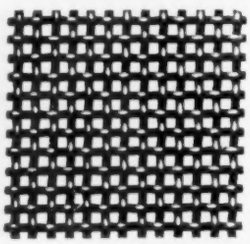

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all its castings except malleable iron under the name Jewell alloy, with grade designations.

Steel in Europe

Foreign Steel Prices, Page 68

London—(*By Cable*)—Production of pig iron in Great Britain in September totaled 500,300 gross tons, compared with 503,300 gross tons in August. Active blast furnace stacks increased from 97 to 98. Due to the shorter month the daily rate of production in September, 16,666 gross tons, exceeded that of August, which was 16,235 tons.

Steel output in September was 734,700 tons, compared with 667,000 tons in August, an increase of 67,700 tons.

Current steel and iron demand in Great Britain is steady. Steelworks are active on heavy sections for structurals, and automotive material is selling moderately. Pig iron output in the Middlesbrough district is about equal to prewar levels. Sales are mainly domestic but export inquiries are increasing. Semifinished steel lines are quiet.

Reports from the Continent state that hope of seasonal improvement has not been fulfilled but orders from Japan and China are helping to sustain steelworks activity despite quiet in the domestic markets.

Navy To Close on Tool And Special Steel Needs

Bids will be taken by the bureau of supplies and accounts, navy department, Washington, Oct. 16 for 11,725 pounds of class T-1, high-speed tungsten tool steel, 16,300 pounds of class T-C, tungsten-cobalt high-speed tool steel and 6060 pounds of class T-1 high-speed tungsten tool steel.

Bids will be taken Oct. 19 for 4000 pounds of grade one, corrosion-resisting sheet steel and 3550 feet of seamless annealed corrosion-resistant steel tubing.

The bureau will take bids Oct. 26 for 6300 feet of high grade galvanized steel plow wire rope, 11,000 pounds of grade M galvanized medium plain steel angles and 108,000 pounds of grade M, black, mediur steel half rounds.

Massey-Harris Co., Racine, Wis., manufacturer of agricultural implements, has moved its San Francisco branch and its Sacramento subbranch to Stockton, Calif., the first step toward locating its Pacific coast headquarters at Stockton.

Here and There In Industry

SHEPARD NILES CRANE & HOIST CORP., manufacturer of cranes and hoists, has concentrated all its manufacturing divisions at Montour Falls, N. Y. The Niles plant at Philadelphia has been closed and its equipment moved to Montour Falls. An erecting shop to produce Niles heavy cranes has been built and the plant formerly occupied by the Cronk & Carrier Mfg. Co., adjoining the Shepard plant at Montour Falls, has been purchased to provide space for the Niles division. Engineering data, fixtures and tools formerly used by the General Electric Co. in building the Shepard motor have been bought and both Shepard and Niles motors are being produced at Montour Falls. The Chemung Foundry division at Elmira, N. Y., which produces the company's castings, is the only division not moved to Montour Falls. Officers of the company are: President, F. A. Hatch; vice president and general manager, Sydney Buckley; vice president and sales manager, Robert T. Turner; secretary, P. E. Stotenbur; treasurer, Mary Dunham.

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Allsteel Press Co., 12015 South Peoria street, Chicago, manufacturer of punch presses and press brakes, has appointed Mechanical Equipment Sales Co., 416 Chamber of Commerce building, Cincinnati, its exclusive representative in the Cincinnati district.

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Announcement is made of consolidation of interests of Carbondale Machine Co., Carbondale Pa., with those of the Worthington Pump & Machinery Corp., Harrison, N. J. in the general refrigerator field, operating in the future as the Carbondale Machine Corp.

The Carbondale Machine Corp. will transfer all necessary personnel and equipment to Harrison, and in the future will build its lines of machinery at Worthington plants.

It is stated that the present extensive and modern shop facilities of Worthington, together with additional provisions being made for the fabrica-

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tion of Carbondale's refrigeration condensers, piping systems, chilling machines and filter presses, will further enhance its ability to serve the trade.

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Spowers Research Laboratories, 551 Fifth avenue, New York, has been organized as specialist in galvanizing by W. H. Spowers Jr., C. G. Fink and Frederick J. Kenny. Consulting service on galvanizing and other metal coating processes will be provided.

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Steel & Tubes Inc., Cleveland, has appointed the Ducommun Corp., Los Angeles and San Francisco, a warehouse distributor for its electrically welded mechanical tubing, in addition to the Service Steel Co., Detroit; Williams & Co., Pittsburgh; Hamilton Steel Co., Cleveland; and Edgar T. Ward's Sons Co., Chicago as mentioned in STEEL for Sept. 24, page 32.

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Hyatt Roller Bearing Co., Harrison, N. J., is supplying roller bearing journal boxes for the high-speed streamline trains which the American Car & Foundry Co., New York, is building for the Baltimore & Ohio railroad. Several years ago the Baltimore & Ohio installed Hyatt roller bearings in an engine tender and since then has likewise equipped some passenger cars.

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Frank D. Lake & Associates, 3024 Cherry street, Toledo, O., have been appointed exclusive sales agents by Bryant Machinery & Engineering Co., 400 West Madison street, Chicago, for Ohio shapers, Dreses radial drills, Ohio horizontal boring, drilling and milling machines, Boye & Emmes engine lathes, Cleereman heavy duty drilling machines and Kling heavy duty grinders.

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Wrought Washer Mfg. Co., Milwaukee, has brought out a line of washers, especially adapted to the aviation industry, meeting the standards established by the army and navy departments.

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Associated Manufacturers of Steel Beer Barrels, of which Glenn W. Bittel, Cleveland, is commissioner, announces that with the affiliation of four more companies, bringing the total to 11, the entire steel beer barrel manufacturing industry is now included in the association's membership. The four new members are: Bossert Corp., Utica, N. Y.; Fedders Mfg. Co., Buffalo; Firestone Steel Products Co., Akron, O., and Motor Wheel Corp., Lansing, Mich. The investment of the industry is said to exceed $5,000,000,000.

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A. O. Smith Corp., Milwaukee, is making its second export delivery within a month, seven oil cracking stills to the Japan Oil Co. and the South Manchurian railroad, for use in a Manchukuo refinery. A few weeks ago four vessels were shipped to France. The stills for Japan were sent indiviually by rail to the Pacific coast and thence by a Japanese freighter. The order was placed by the Universal Oil Products Co., Chicago, which designed the plant for use with its own process.

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SAVE MACHINING . . . METAL . . . MONEY

PITTSBURGH TOOL STEEL WIRE CO.
MONACA, PA.

Production

(*Concluded from Page* 18)

were idle last week, but are scheduled to resume this week, as is the Cleveland plate mill.

Buffalo—Unchanged last week at 24 per cent. It is probable that this rate may continue at this level for an indefinite period.

Detroit—Remained at 59 per cent last week, with only 10 out of 17 open hearths active.

New England—Held at 40 per cent last week, with schedules for this week indicating no change.

Shipment of finished steel by the United States Steel Corp. in September at 370,306 tons was 7717 tons less than the 378,023 tons shipped in August. However, the daily rate of shipments in September was 14,812 tons, compared with 14,000 tons. Daily rate of September shipments was 22,121 tons in 1933, 12,154 tons in 1932 and 18,730 tons in 1931.

FEWER PLANTS MAKE PIG IRON

Seventy-two establishments were making pig iron and ferroalloys in 1933, compared with 80 in 1931, according to the biennial census of manufactures. The number of wage earners employed in 1933 averaged 12,098, compared with 13,572 in 1931. Total value of blast furnace products was $213,685,290, compared with $311,371,093 in 1931. Comparisons follow:

	1933	1931
No. of establishments	72	80
Wage earners (average for the year)	12,098	13,572
Wages	$11,564,675	$19,258,799
Cost of materials, fuel and purchased electric energy	$183,956,554	$259,131,549
Products, total value	$213,685,290	$311,371,093
Blast furnace prods.	$210,585,568	$305,949,133
Other products, value and receipts from sale of electric energy	$3,099,722	$5,421,960
Value added by manufacture	$29,728,736	$52,239,544

They Say:

WEALTH is not money. Wealth cannot be measured accurately in terms of money. It is the sum of all things that are possessed by individuals and by the state. The wealth of a country consists of land, houses, factories, machinery, automobiles, railroads, public improvements, highways, water systems, stocks of finished products and raw materials held by manufacturing concerns, and the personal possessions of individuals, plus the gold and silver supporting circulating money. The wealth of the United States is everything in the United States.

"There has been a great shrinkage

in the wealth of the United States since 1929. This shrinkage is evidenced by decreased family possessions; by idle and ruined factories; by homes that have been abandoned and destroyed; by many buildings torn down in cities; by the reduction in live stock and grains, and other commodities. As the shrinkage has been nearly universal, and as the conveniences and comforts of life come from the possession and use of material things, everyone is affected by shrinkage in wealth, and all would be benefited by a general increase in wealth. Wealth is increased by the creation of material things, by farms and fisheries, mines and lumbering, factories and construction.

"The solution of unemployment is intimately connected with the creation of wealth. The analyses made by the durable goods industries committee and others, show clearly that the unemployment problem centers in those industries which produce wealth, and is particularly severe in the industries making the durable goods, which are more permanent wealth. If the creators of wealth were in a position to employ those usually employed, then the service industries would also require additional employees. The major task to assure the continued material well being of our people and the re-employment of those unemployed, is to stimulate and encourage the enterprises which produce wealth. This can be done by aiding their operation in every orderly way, and by removing restrictions interfering with operation, and with the distribution of the products created.

One of the essentials to recovery and increased production, particularly of durable goods, is a free flow of funds into investments. Largely with investment funds, are durable goods bought and made.

"Lack of confidence, which reduces the demand for all kinds of commodities, is interfering with the creation of wealth, and with employment. Individuals hesitate to make purchases—unless absolutely required for current living—if they lack confidence in the future. What is true of individuals is just as true of business enterprises. A statement by the government of its intentions, would help to create confidence. "George P. Torrence, president, Link-Belt Co., Chicago.

Join Standards Group

American Iron and Steel institute has become a member-body of the American Standards association, New York, while the United States Machine Screw Service bureau has been made an associate member.

J. H. Edmonds, general manager of the bolt division, Bethlehem Steel Co., Lebanon, Pa., has been made representative of the American Institute of Bolt, Nut and Rivet Manufacturers on the standards council of the association. The institute recently became a member-body of the Standards association.

Men of Industry

(*Concluded from Page* 24)

president, as has R. J. Holtermann, district manager for the company's operations west of the Rocky mountains, with headquarters in San Francisco.

Harold Smith has been elected vice president of the Westinghouse Electric International Co. He has been in the legal department of Westinghouse Electric & Mfg. Co. since 1919, general solicitor since 1926 and vice president since 1929.

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N. M. Mintz has been appointed representative of the Electro Dynamic Works division of the Electric Boat Co., Bayonne, N. J., with headquarters at Fortieth street and Calumet avenue, Chicago. The company builds motors and generators.

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William Anderson, 3701 Dartmouth avenue, Dallas, Tex., has been appointed southwestern representative for the Central Iron & Steel Co., Harrisburg, Pa.

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Francis E. Lee, New York, formerly with the Nichols Copper Co. has been appointed administration member of code authorities for the horseshoe and allied products, die casting and machine and applied staple and stapling machine industries.

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David Robertson, former superintendent of the Anniston Steel Co., will assist in putting in operation the new electric furnace which the Pittsburgh Lectromelt Furnace Corp., Pittsburgh, is building for the Kilby Car & Foundry Co., Anniston, Ala.

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Paul M. Weiss, general manager of the North Tonawanda, N. Y., plant of Crane Co., has been promoted to assistant works manager of the company's Chicago division.

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Joseph W. Meadowcroft, past president of the American Welding society and associated with the Edward G. Budd Mfg. Co., Philadelphia, recently returned from a four-year stay in Paris, France, with the Citroen Motor Car Co. While there, he was decorated as an officer in the legion of honor of Morocco by the sultan of that country for directing production of the sultan's cars in the Citroen plant.

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Wilbur H. Winters, general superintendent of foundries for the American Brake Shoe & Foundry Co., New York, has been elected a vice president of the company.

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William B. Stout, protagonist of the all-metal airplane, designer of a light-weight railcar and president of the Stout Engineering Laboratories, Detroit, has been nominated president of the Society of Automotive Engineers for 1935.

Nine vice presidents, one representing each professional activity of the society, also have been nominated. They are: C. H. Chatfield, assist-

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ant director of research, United Aircraft & Transport Corp. (of Conn.); Philip B. Taylor, chief engineer, Wright Aeronautical Corp.; C. L. Cummins, president, Cummins Engine Co.; D. P. Barnard, assistant director of research, Standard Oil Co. (Ind.); L. P. Kalb, chief engineer, Continental Motors Corp.; C. O. Richards, body engineer, Cadillac Motor Car Co.; V. P. Rumely, Hudson Motor Car Co.; T. C. Smith, engineer, motor-vehicles and construction apparatus, American Telephone & Telegraph Co.; and C. O. Guernsey, chief engineer, J. G. Brill Co.

Richberg Puts OK On Steel Code

(*Concluded from Page* 15)

When certain statements of mine in Washington a few days ago were thought to foreshadow the early end of any restraints upon production volume or price competition, I received a terrifying amount of approval and condemnation within 24 hours.

Let me now express most emphatically my opinion that no one who has an adequate knowledge of this problem would venture to lay down any formula or principle to be applied rigidly in the making or revision of all codes. It would be a major calamity to abandon the efforts which, although only partially successful, have brought better order and health to certain industries.

There can be no doubt that a great advance has been made already in dealing particularly with industries exploiting natural resources, such as coal, oil, lumber, and various metals. Improved conditions have been established in many retail trades. Protections have been afforded to conscientious employers in maintaining better labor conditions; and to honest manufacturers and merchants in producing and selling good merchandise.

These gains must not be lost. But their preservation is in some cases dependent upon the maintenance of controls to which many business men are sincerely opposed; and upon which the public looks generally with suspicion and frequently with positive hostility. In my opinion much of this suspicion and hostility can be dispelled if two principles are made effective.

Define Right and Wrong

First, there should be a clear line drawn between the right of business men to associate freely for the preservation of fair competition and the illegality of associations for the purpose of preventing or restricting fair competition.

So long as we are seeking to preserve a competitive economy and are genuinely opposed (as I am) to any form of socialistic state control of industry, the general use of cartel methods of production control and price fixing would be not only destructive of our industrial system but also destructive of our political system and our constitutional liberties.

The second principle, which I believe should be made effective, is this: Whenever, in order to conserve natural resources, or to maintain decent wages and hours and to protect a fair return on investments, or to prevent clearly unfair competition, it is found necessary to exert any restraint upon volume of production or price competition, two safeguards should be employed. The first is formulation and administration of such code provisions by those truly representative of a large majority of the volume of business and the number of separate enterprises engaged therein. The second is a close and detailed supervision of the process of self-regulation by competent and impartial representatives of the public.

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Equipment

Cleveland—Lincoln Electric Co. here has placed contracts for a list of lathes and grinders totaling about $20,000. Whether or not this equipment is intended for an extension of plant facilities is not known. Extensive buying of foundry equipment, including molding machines and sand preparation units has been done by Ford, General Motors and Packard in Detroit. The latter of these three is opening a much larger assembly plant in East Windsor, Ont., to produce cars for export shipment to England, France and Spain. This plant will be completed by Jan. 1.

Pittsburgh—Impending award of the new strip mill at McDonald, O., works for Carnegie Steel Co., is still overhanging the steel mill equipment market. While this promises early award, there are few other inquiries of a similar nature. Estimating continues on changes which Republic Steel Corp. may make at Cleveland, contingent on its acquisition of the Corrigan-McKinney Steel Co. These proposals will form around a continuous 4-high strip mill capable of rolling to a width as yet undetermined. Last week, Youngstown Sheet & Tube Co. is understood to have placed conditional contracts with the Mesta Machine Co., Pittsburgh, for the cold-rolling equipment incidental to the hot mill which Mesta Machine Co. has been building for this buyer. The cold mill will roll down to 20 and 22 gage. Department of street railways Detroit, recently purchased 88 street car gear drive units of the parallel type from the Nuttall works of Westinghouse Electric & Mfg. Co. Replacing worm gear units now in use, the new drives permit reduction of dead weight on the axle, and use of smaller wheels.

Chicago — Equipment markets in some instances show the poorest activity for the year to date despite a fair volume of inquiries. Quietness generally is ascribed to unwillingness of users to make large investments in capital goods although the low level of industrial operations in some instances contributes to the lack of interest in new buying. A slight increase in machine tool inquiries is in contrast to the small volume of orders. While used tools still develop some inquiries, these are relatively fewer than was true during the past several years. Foundry equipment demand is light and generally unchanged.

Construction and Enterprise

New England

EVERETT, MASS.—New England Alcohol Co., Chemical lane, will build a 2-story plant 60 x 70 feet, contract being let to York Ice Machinery Corp., 200 Causeway street, Boston. Cost will be $28,500 or more.

LYNN, MASS.—Essex Die Co. has been formed by H. Kimball, 6 Beede avenue, to manufacture dies and similar products.

WORCESTER, MASS.—Crompton & Knowles Loom Works, Grand street, plans extensions and improvements to the power house at its textile mill machinery plant, with new equipment. Francis J. Sill, East Main street, Westboro, Mass., is retained as consulting engineer.

PROVIDENCE, R. I.—Sherman Screw Products Co. has been organized to manufacture screw machine products, by John D. MacMillen, Ida E. Swedberg and Lydia S. Morrell, Providence, R. I.

New York

AUBURN, N. Y.—W. B. Patterson, city manager, will call for bids soon for a municipal electric light and power plant, including diesel engine-generator units and street lighting system. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer. (Noted Aug. 27.)

BINGHAMTON, N. Y.—Binghamton Metal Forms Inc. has been formed by Herman A. Speh, 13 Murray street, Binghamton, N. Y., and associates to manufacture metal products.

NEW YORK—Griffin Wellpoint Co. has been organized by Timothy G. Griffin and associates, 60 East Forty-second street, to manufacture well equipment and pumping machinery.

Pennsylvania

PHILADELPHIA—Resinous Products & Chemical Co., 222 West Washington square, plans a new 2-story plant at Richmond and Brill streets, with electric power equipment, to cost about $70,000.

PITTSBURGH—Burdett Oxygen & Hydrogen Co.'s plant at Fortieth street was slightly damaged by an explosion Oct. 6.

NEW CASTLE, PA.—City council is having survey made and estimate of cost supplied by Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is consulting engineer. (Noted Oct. 8.)

New Jersey

WAYNE, N. J.—Colville Container Corp. has been organized by Albert R. Colville and associates, Wayne township, to manufacture steel drums and other metal containers.

Ohio

CLEVELAND — Fruehauf Trailer Co. has leased a building of 10,000 square feet at 4612 Chester avenue, for manufacturing purposes.

CLEVELAND—Lincoln Electric Co., 12818 Coit road, is enlarging its shops and installing considerable new equipment, including lathes, grinders and other tools.

CLEVELAND—Otto Fishbein Iron & Steel Co. has been incorporated with $10,000 capital by Grover C. Hosford, 1630 Standard Bank building, Naomi M. Belcher and Otto Fishbein.

CLEVELAND—Nottingham Steel Co. has leased a brick fireproof manufacturing building of 12,000 square feet at 935 East Sixty-third street, formerly occupied by the Trattner Steel Co.

CLEVELAND—Sands Mfg. Co., Sweeney avenue, has received a government order for 1300 large capacity automatic gas storage water heaters and another for 500 automatic coal burning storage water heaters. The heaters will be shipped to the various United States army posts as part of the government's plan to modernize the army post quarters.

CHILLICOTHE, O.—Mead Corp., Alan G. Goldsmith, secretary, will rebuild its burned laboratory at cost of about $65,000, including electric power equipment. (Noted Oct. 1.)

TOLEDO, O.—Chesapeake & Ohio railroad, Richmond, Va., plans additions to its coal and ore docks at Presque Isle, near Toledo, with installation of conveying, elevating, loading and other material handling equipment and electric power equipment, at cost of about $500,000.

Michigan

BENTON HARBOR, MICH.—Nineteen Hundred Corp., Louis C. Upton, president, has completed a building and engineering program which will involve expenditure of upwards of $100,000 on plant enlargements at St. Joseph, Mich., and at Binghamton, N. Y. At St. Joseph, approximately 35,000 square feet of manufacturing and warehouse space will be added.

DETROIT—Albert Kahn Inc., New Center building, is completing plans for an addition to the plant of the Bower Roller Bearing Co., 3040 Hart street, Detroit.

DETROIT—O. W. Burke Co. has contract for an extension to the Plymouth-Mt. Elliot plant of the Chrysler Corp., Detroit. Albert Kahn Inc., New Center building, architect.

DETROIT—Awray Corp., 428 Bellevue avenue, has been incorporated to deal in machinery, by G. Greenfield, 2540 National Bank building.

DETROIT—Packard Motor Co. has plans for enlarging its branch plant at East Windsor, Ont. Production on the increased scale will be started by Jan. 1, 1935. Cars for export to England, Spain and France and a lighter weight car for Canadian use will engage the plant.

GRAND RAPIDS, MICH.—Excello Die Casting Co. has been formed to deal in die casting machinery, by Edward J. Hultman, 1140 Monroe avenue, northwest.

GRAND RAPIDS, MICH. — Grand Rapids Plating Co. has removed its equipment from the Richards storage building to a factory structure which it purchased. It will occupy the entire building, except half of the sub-basement, which is occupied by the Excello Die Casting Co., a new industry.

MT. CLEMENS, MICH.—Ulrich Estate is planning to rebuild a factory building in Mt. Clemens for the Fleming

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Candy Co. Estimated cost of work is $20,000.

MUSKEGON HEIGHTS, MICH.—Enterprise Brass Works has started to manufacture a new automatic humidifier for warm air furnaces for the Turney Corp., a new concern recently organized here.

SAGINAW, MICH.—Smith, Hinchman & Grylls, 800 Marquette building, Detroit, are preparing plans for a brewing plant addition in Saginaw for the Banner Brewing Co.

Illinois

CHICAGO—C. H. Hollup, Corp. Chicago, manufacturer of welding rods, is building a plant at 3351-63 West Forty-seventh place, Chicago, which will result in tripling present production capacity. The building will be 129 x 191 feet and will cost $100,000. John A. Amos, president.

DANVILLE, ILL.—Plans are being made by the city for a sewage treatment plant to cost $1,000,000, including screen house, diffusion tanks, sludge pump house, and other buildings, with equipment. C. DeLeuw & Co., 20 North Wacker drive, Chicago, are engineers.

RIVERDALE, ILL.—Acme Steel Co., 2840 South Archer avenue, Chicago, will build a 2-story addition to its strip mill here and will install electric power equipment, at total cost of about $200,000.

Alabama

MOBILE, ALA.—Am-Mex Corp., recently incorporated, will operate veneer plant of Navco Hardwood Co., at Navco. Mark Lyons is chairman of new industries committee of chamber of commerce.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids Oct. 23, on diesel generator sets and spare parts.

Georgia

MOUNT VERNON, GA.—Town has loan and grant of $26,000 for waterworks, including pump house and equipment, storage tank and distribution system.

Kentucky

EDDYVILLE, KY.—City will receive bids Oct. 22 for waterworks project to cost $40,000. J. S. Watkins is consulting engineer, Lexington, Ky.

NEWPORT, KY.—Andrews Steel Co., Newport, Ky., will build a water pumping station on the Licking river, federal permission for which has been requested through Cincinnati district army engineers.

Mississippi

RIDGELAND, MISS.—Village will receive bids Nov. 6 for constructing waterworks system; project includes 5000-gallon galvanized steel tank. H. R. Covington, engineer, Canton, Miss.

North Carolina

GREENSBORO, N. C.—Monarch Machine Products Co. Inc. has been formed by C. Fred Carlson and Huger S. King.

MURFREESBORO, N. C.—Town will probably receive bids in about 30 days for constructing water distribution system, involving 75,000-gallon elevated tank. Sponn & Lewis, engineers, Greensboro, N. C.

STATESVILLE, N. C.—City has loan and grant of $60,000 for improvements to waterworks, including pumping plant, transmission lines, and improvements to existing filtration plant.

West Virginia

GRAFTON, W. VA.—United States engineer office, Pittsburgh, will ask bids soon for a hydroelectric plant on the Monongahela river near Grafton. Bids will be asked first on the dam and then on power development construction and equipment. A federal appropriation of $10,000,000 has been approved.

KENOVA W. VA.—Sun Oil Co., Philadelphia, plans to build an unloading station at Kenova, W. Va., on the Ohio river.

Missouri

ST. CHARLES, MO.—City will receive bids Oct. 22 for water purification plant; has loan and grant of $65,000. Russell & Axon, engineers, 4903 Delmar, St. Louis.

Arkansas

DUMAS, ARK.—City has loan and grant of $42,000 for sewage plant.

MANSFIELD, ARK.—City, Clem Wilder, city attorney, is planning to construct a waterworks system to cost about $56,000. W. L. Winters is engineer, 311 Merchants National Bank building, Fort Smith, Ark.

POCAHONTAS, ARK.—City plans pumping station, settling pond, new filters, etc. Dickinson & White, Rector building, Little Rock, Ark., are engineers.

Oklahoma

MUSKOGEE, OKLA.—City will take a vote Nov. 6 on $1,260,000 power plant bonds.

PAWNEE, OKLA.—City will receive bids Oct. 24 for power plant equipment. PWA loan and grant of $60,000 has been approved. O. F. Dewell is engineer, Pawnee, Okla.

Texas

AUSTIN, TEX.—E. B. Snead, Enfield-Gracy building, Austin, has contract at $81,801 for water and light plant improvements; bids on improvements to electric plant and enlargement of head house at filter plant rejected; plans will be revised and new bids called.

FAIRFIELD, TEX.—City, Harvey B. McAllester, consulting engineer, 914 Washington street, Waco, Tex., will receive bids Oct. 30 for waterworks and sanitary sewer systems, including water well and pumping equipment, elevated tank and tower, etc.

LITTLEFIELD, TEX.—City, W. G. Street, city secretary, plans $18,000 waterworks extensions, including pumping plant and engines and electric generator. H. N. Roberts, engineer, 2415 Twentieth street, Lubbock, Tex.

NAPLES, TEX.—City, Z. Z. Smith, mayor, receives bids Oct. 31 for waterworks system, consisting of deep well and pump, 50,000-gallon elevated tank, etc. Loan and grant of $45,300 has been approved. H. R. F. Heland, engineer, Frost National Bank building.

Wisconsin

COLUMBUS, WIS.—Nordberg Mfg. Co. is low bidder at $76,142 for furnishing diesel-type generating equipment for the new municipal power plant here.

MILWAUKEE—A. O. Smith Corp. has received a $75,000 order from Newport Industries Inc., Pensacola, Fla., for 20

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MILWAUKEE—Alfa Machine Co., 1205 North Fourth street, has acquired production rights and has started to manufacture a new machine for tufting mattresses.

MILWAUKEE—Stainless Steel Castings Co. of America Inc., 802 First Wisconsin National Bank building, has been organized by Leo G. Smith, to manufacture stainless steel. Location of plant will be announced shortly.

MILWAUKEE—Department of public works, J. P. Schwaba, city engineer, is making plans for a filtration plant at Linwood avenue and Lake Michigan, to cost $4,000,000, work to be started in spring of 1935. Alvord, Burdick & Howson, 20 North Wacker drive, Chicago, are consulting engineers.

SOUTH MILWAUKEE, WIS.—Bucyrus-Erie Co. has received contract for furnishing six power shovels of 5-yard capacity from Mason-Wash-Atkinson-Kier Co., general contractor on $63,000,000 Columbia river dam.

Minnesota

ALEXANDRIA, MINN.—H. S. Campbell, city clerk, will receive bids until Oct. 18 for a forced draft cooling tower, piping and miscellaneous changes to the municipal heating and generating plant. Burlingame & Hitchcock, 526 Sexton building, Minneapolis, are engineers.

BEMIDJI, MINN.—Minnesota state highway department, N. W. Elsberg, highway commissioner, 1246 University avenue, St. Paul, will soon take bids for construction of a 1-story shop and maintenance building for highway machinery, 60 x 64 feet.

BUTTERFIELD, MINN.—J. O. Ness, city recorder, will receive bids until Oct. 19 for municipal waterworks system, including a 50,000-gallon steel tank on a 110-foot steel tower. Druar & Milinowski, 830 Globe building, St. Paul, are engineers.

FAIRFAX, MINN.—A. E. Carver, city recorder, will receive bids until Oct. 16 for construction of a municipal power plant building and for furnishing diesel engine generating equipment and auxiliary equipment. G. M. Orr & Co., 408 Baker building, Minneapolis, engineers.

STILLWATER, MINN.—State plans construction of a 1-story foundry addition at the state prison, 28 x 180 feet, to cost $40,000. Bids for construction will be taken late in October. Charles A. Hausler, 702 Minnesota building, St. Paul, is architect.

ST. PAUL—Theodore Hamm Brewing Co., Minnehaha street and Greenbrier avenue, has launched an improvement program totaling $475,000, including a malt house and elevator, 100 x 190 feet, costing $400,000, and improvements to brew house to cost $75,000. W. A. Lang is in charge of engineering and construction for the company.

Iowa

DES MOINES, IOWA—Bookey Packing Co., Eighteenth avenue southeast, and Scott street, has awarded a contract to John Monahan for construction of a 2-story addition to its packing plant.

Nebraska

LINCOLN, NEBR.—Earl Schrepf will build a 1-story packing plant at Fourth avenue and N street, 40 x 70 feet.

Colorado

TORRANCE, COLO.—Hughes-Mitchell Processing Co. is erecting a plant here to cost about $1,000,000, to be used for treating lead and zinc ores.

Arizona

TOMBSTONE, ARIZ.—Mellgran Mines Corp., care Lewis Heilborn, Texarkana, Tex., will install electric power equipment in its silver and gold mining properties here, including a new milling plant. A fund of $420,000 is being financed, R. E. Grace, Phoenix, Ariz., is secretary.

Pacific Coast

EUREKA, CALIF.—The $1,224,000 Mad river water system has been approved by the Eureka electorate. The project will involve construction of a 23-mile pipe line and erection of dam and reservoir. Construction is expected to start by the first of the year. Evan D. Gardiner, city engineer.

HOLLYWOOD, CALIF.—Four sound stages will be started during October at Warner Brothers-First National Studios. They will be of steel frame, with steel roof trusses, rock wool insulation, steel sliding doors and gas steam heating equipment, to cost $300,000 and will contain $100,000 worth of equipment.

LONG BEACH, CALIF.—Bids will be asked shortly for construction of a group of buildings for the David Starr Jordan high school, including shop buildings, to cost $199,000. Martin C. Parker, 1071 East Broadway, Long Beach, Calif, is architect.

LOS ANGELES—E. J. Moffett Co., 510 West Sixth street, has purchased 1000 acres of timber land in the mountains and is preparing to build a sawmill at Cutler, Calif.

LOS ANGELES—William P. Neil Construction Co., 4814 Loma Vista, has been awarded contract for an $84,000 warehouse building at 201 Santa Fe avenue for the Graybar Electric Co.

PASADENA, CALIF.—Prof. Franklin Thomas, district official, informed the board of city directors early in October that construction of the city's $1,200,000 section of the Metropolitan water district's conduit would be started as soon as the S. E. R. A. passes on the application. More than 2000 local unemployed men will be put to work when construction gets under way.

BONNEVILLE, OREG.—PWA has allotted an additional $1,200,000 to the Bonneville project for enlargement of navigation locks to permit passage of seagoing vessels.

REPUBLIC, WASH.—Plant of the local power and light company recently sustained damage by fire. S. S. Frantz, secretary, announced rebuilding will begin at once.

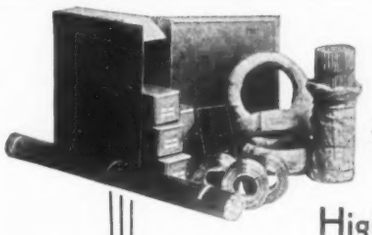
SEATTLE — Navy department, Washington, will open bids Nov. 14 for construction of a seaplane hangar at Pearl Harbor, T. H., including steel frame, doors, windows, etc.

SEATTLE—J. D. Ross, superintendent of city light, has made public a survey of the private holdings of the Puget Sound Power & Light Co., appraised at approximately $100,000,000. He proposes that Seattle purchase the company's light, power and steam properties, including the Rock Island plant, and engage in a statewide distribution of power and light.

Dominion of Canada

NEW LISKEARD, ONT.—Wabi Iron Works will build a 1-story foundry 60 x 76 feet and 32 x 57 feet. H. B. Long, Whitewood avenue, is architect. Prices on complete equipment are desired.

SARNIA, ONT.—National Refining Co. of Canada has a $350,000 modernization program approved, which includes a new cracking plant, vapor recovery system and other new units.



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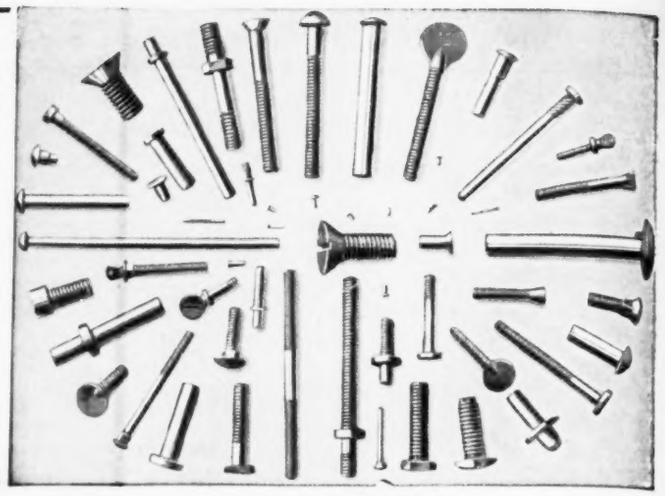

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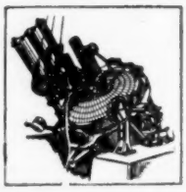

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1933 Rolling Mill Census

(*Concluded from Page 25*)

modities and these are covered in the census figures for the industries to which they normally belong. These commodities include fabricated structural steel; switches, frogs and crossings; castings; steel springs; cast iron car and locomotive wheels, and others.

The comparative figures for 1933 and 1931 are as follows:

Class and kind	1933	1931
Railroad spikes—total—		
Establishments	19	19
Kegs (200 pounds)	678,417	829,629
Value	$3,140,852	$4,337,736
Bolts, nuts, rivets, washers, etc., total production, value	$41,849,994	[2]$49,845,849
Made in rolling-mill industry—		
Establishments	26	23
Value	$6,783,631	[2]$8,477,039
Made in other industries—		
Establishments	161	185
Value	$35,066,363	$41,368,810
Iron and steel:		
Bolts and nuts, iron steel — quantity reported—		
Kegs (200 pounds)	2,140,585	[3]
Value	$25,005,233	
Quantity not reported, value	$5,671,084	
Rivets, iron and steel —Quantity reported		
Kegs (200 pounds)	624,473	
Value	$4,306,118	
Quantity not reported, value	$374,345	
Washers, iron and steel —Quantity reported		
Kegs (200 pounds)	127,551	
Value	$1,799,695	
Quantity not reported, value	$1,223,289	
Turnbuckles, toggle bolts, etc., value	$1,268,834	
Nonferrous bolts, nuts, rivets, washers, etc., value	$1,493,308	
Not reported by kind or quantity	$708,088	
Cut and wrought nails, spikes, and tacks, total production, value[1]	$4,542,622	$5,059,805
Establishments	27	34
Cut nails and spikes—		
Pounds	27,186,500	45,796,200
Value	$1,935,930	$2,267,060
Cut tacks—Quantity reported—		
Pounds	17,260,603	25,236,567
Value	$1,569,623	$2,290,599
Quantity not reported, value	$440,235	
Horseshoe nails—		
Kegs (100 pounds)	57,915	43,900
Value	$596,834	$502,146
Galvanized plates, sheets, and strips, made for sale as such[1]:		
Establishments	30	31
Plain—		
Tons (2240 pounds)	430,809	444,654
Value	$28,381,251	$31,429,894
Corrugated or crimped		
Tons (2240 pounds)	243,542	262,307
Value	$15,922,460	$18,380,907
Corrugated or crimped sheets, not galvanized, made in rolling-mill industry:		
Tons (2240 pounds)	2,338	3,026
Value	$140,486	$175,218
Wrought pipes and tubes, total production, value[5]	$120,690,726	$200,224,982
Wrought welded—Boiler tubes, total production—		
Establishments	5	7
Tons (2240 pounds)	17,343	16,939
Value	$1,829,922	$1,920,016
Oil-country casing, tubing, and pipe, made in rolling-mill industry—		
Establishments	8	8
Tons (2240 pounds)	69,146	151,640
Value	$4,487,753	$9,822,162
Oil-country casing, tubing, and pipe, made in other industries—		
Establishments	10	17
Tons (2240 pounds)	82,131	434,215
Value	$6,195,028	$33,172,356
Other black pipe, made in rolling-mill industry—		
Establishments	18	17
Tons (2240 pounds)	293,510	465,115
Value	$18,354,205	$32,270,539
Other black pipe, made in other industries—		
Establishments	30	38
Tons (2240 pounds)	187,111	265,866
Value	$13,522,360	$21,679,210
Galvanized pipe, made in rolling-mill industry—		
Establishments	11	11
Tons (2240 pounds)	174,472	192,723
Value	$13,562,171	$18,019,000
Galvanized pipe, made in other industries—		
Establishments	13	13
Tons (2240 pounds)	77,365	116,673
Value	$6,883,836	$11,552,418
Mechanical tubing, made in industries other than the rolling-mill industry—		
Establishments	13	15
Quantity reported—		
Tons (2240 pounds)	31,906	28,627
Value	$5,213,630	$4,770,907
Quantity not reported, value		$575,376
Heavy-riveted and lock-joint, total production value	$1,286,443	$4,032,933
Seamless, made in rolling mill industry—		
Boiler tubes—		
Establishments	11	9
Tons (2240 pounds)	62,737	70,784
Value	$7,083,230	$8,594,836
Oil-country casing, tubing, and pipe—		
Establishments	11	12
Tons (2240 pounds)	319,343	568,733
Value	$26,850,145	$40,386,530
Other black pipe and galvanized pipe—		
Establishments	8	7
Tons (2240 pounds)	18,562	12,788
Value	$1,690,788	$1,603,177
Mechanical tubing—		
Establishments	14	12
Tons (2240 pounds)	75,543	69,687
Value	$13,731,215	$11,835,522
Horse and mule shoes:[3]		
Establishments	8	8
Kegs (100 pounds)	311,398	293,538
Value	$1,298,166	$1,428,968
Horse and mule shoe calks:		
Establishments	4	8
Value	$220,561	$250,794
Cold-rolled strip steel, flat bright, except cold-rolled from drawn wire[6], total production:		
Tons (2240 pounds)	404,120	[3]341,409
Value	$35,306,938[7]	$34,017,294
Made in rolling-mill industry—		
Establishments	19	[2]16
Tons (2240 pounds)	250,306	[2]200,002
Value	$20,210,567	[2]$19,113,018
Made in other industries—		
Establishments	28	25
Tons (2240 pounds)	153,814	141,407
Value	$15,096,371	$14,904,276
Widths 6 inches and narrower—		
Tons (2240 pounds)	211,498	166,071
Value	$21,342,538	$19,155,441
Wider than 6 inches but under 12 inches—		
Tons (2240 pounds)	86,661	75,858
Value	$6,844,433	$7,250,391
Widths 12 inches and over but less than 24 inches (not including motor-vehicle fender steel)—		
Tons (2240 pounds)	67,976	[2]49,909
Value	$4,845,607	[2]$4,181,754
Fender steel (for motor-vehicle fenders)—		
Tons (2240 pounds)	37,985	49,571
Value	$2,274,360	$3,429,708
Cold-finished steel bars, total production, value	$25,191,504	$24,833,337
Made in rolling-mill industry—		
Establishments	10	9
Tons (2240 pounds)	106,333	93,826
Value	$6,976,986	$7,090,499
Made in other industries—		
Establishments	23	27
Tons (2240 pounds)	265,891	(7)
Value	$18,214,518	$17,742,838
Rounds, 2 inches in diameter and smaller—		
Tons (2240 pounds)	189,750	140,195
Value	$12,481,750	$10,007,855
Rounds, more than 2 inches in diameter—		
Tons (2240 pounds)	86,412	81,859
Value	$5,736,590	$5,873,189
Cold-finished steel bars (rounds) not distributed as to size—		
Quantity reported—		
Tons (2240 pounds)	11,556	34,827
Value	$785,075	$2,682,593
Quantity not reported, value		$697,687
Shapes (square, hexagonal, and flat)—		
Tons (2240 pounds)	84,506	72,608
Value	$6,188,089	$5,572,013
Bearings and parts, ball and roller:		
Establishments	47	56
Value, total	$40,530,143	$50,528,087
Ball bearings and parts	$21,153,613	$28,309,509
Roller bearings and parts	$19,376,530	$22,218,578
Rolls for rolling mills—		
Establishments	40	29
Steel[1]—		
Tons (2240 pounds)	26,807	32,464
Value	$4,481,261	$5,413,104
Iron—		
Tons (2240 pounds)	75,241	66,460
Value	$8,603,052	$7,935,177

[1]Reported almost wholly by rolling-mill industry.

[2]Revised.

[3]No data.

[4]For production of wire nails, brads, and spikes, see report on "Wire and wire products."

[5]Not including value of couplings reported separately.

[6]For production of cold-rolled from drawn wire, see report for "Wire and wire products."

[7]Data incomplete.

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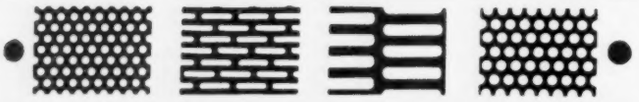

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